PRODUCT DATA

COMPACT P - SERIES BY NILAN

GO GREEN BY NILAN

CERTIFIED COMPONENT
Passive House Institute

SG Ready
Smart Heat Pumps

Domestic

Passive heat recovery

Active heat recovery

Ventilation < 300 m³/h

Comfort heating

Comfort cooling

Sanitary hot water production

Heating

NILAN®
OUTSTANDING INDOOR CLIMATE

THE VENTILATION AND HEATING SOLUTION OF THE FUTURE

Compact P is developed for future homes. The system can be used in all types of low-energy and passive buildings, but can also ensure low energy consumption in any home or flat.

Top-class efficiency

Compact P is equipped with the latest technology, comprising a highly-efficient counterflow heat exchanger, as well as a special designed heating pump that utilises the residual energy in the extracted air.

Overall, the system yields top-class performance. The counter flow heat exchanger has a temperature efficiency of up to 95%, combined with a heat pump that ensures a high supply air temperature and very low costs to production of sanitary hot water.

The integrated AIR 9, GEO 3, GEO 6 and GEO 9 heat pumps utilise the latest compressor technology to ensure that the heat output is continuously matched to the home's requirements.

Many benefits

The compact design and numerous functions combined in one unit ensures minimum installation, space requirements, as well as rapid and easy installation. The latest technology and high-quality components not only provide an optimum indoor climate, but also low annual operating costs, making this a sound investment in every respect.

ONE UNIT - SEVERAL SOLUTIONS

Since Compact P is module-based, it offers not just one, but several solutions. The unit can be combined with a geothermal or an outdoor air heat pump that can be fully integrated into Compact P. As either a supplementary or total heating solution, Compact P combines up to five functions:

- Ventilation with active and passive heat recovery
- Comfort heating
- Comfort cooling
- Sanitary hot water production
- Heating of the home (with AIR 9 or GEO 3/6/9)

Compact P

- Ventilation with heat recovery
- Sanitary hot water production

Compact P can ventilate up to 300 m^3/h and recovers more than 100 % of the energy from the extracted air via a counter flow heat exchanger that is combined with a heat pump.

The heat pump produces hot water and contributes to heating the supply air.

The heat pump has a reversible cooling circuit, so that in the summer it can cool the intake air while it also producing hot water.

Compact P EK has a built in electrical kettle to heat the home via the central heating system.

Compact P AIR 9

- Ventilation with heat recovery
- Sanitary hot water production
- Space heating via an air/water heat pump

Besides ventilating the home and producing hot water, Compact P AIR 9 can also heat the home via underfloor heating or low-energy radiators.

AIR 9 is an air/water heat pump with a high heat output and a low energy consumption.

Compact P GEO 3/6/9

- Ventilation with heat recovery
- Sanitary hot water production
- Space heating via a geothermal/water heat pump

Besides ventilating the home and producing hot water, Compact P GEO 3/6/9 can also heat the home via under floor heating or low-energy radiators.

GEO 3, GEO 6 and GEO 9 are geothermal heat pumps that both have a high output and low energy consumption compared to their sizes.

AUTOMATION

CTS 700 Touch panel

The Compact P is controlled by its CTS 700 touch panel, which provides a wide range of functions, including menu-controlled operation, week programmes, time-controlled filter monitor, fan speed adjustment, temperature control, error messages etc.

The CTS 700's factory settings are default settings that can be adapted to operating needs and requirements, to achieve optimum operation and utilisation of the system.

Operating instructions for CTS 700 can be found in the separate user guide supplied with the system.

Smart Grid function

Operating mode 1 - is lack of power. Therefore the GEO and AIR heat pumps will be turned off in those periods, typical up to 2 hours.

Operating mode 2 - is normal operation. The unit is running by the set values.

Operating mode 3 - is low cost power available. It is possible to use more power for e.g. hot water production by increasing the setpoint as well as increasing the supply temperature for the underfloor heating and use the floor as a buffer for the periods where the heat pump most be shut off.

Operating mode 4 - is overcapacity of power. It is possible to use more power for hot water production by increasing the setpoint but the GEO and AIR heat pumps must increase the supply temperature for the underfloor heating.

Intelligent humidity control

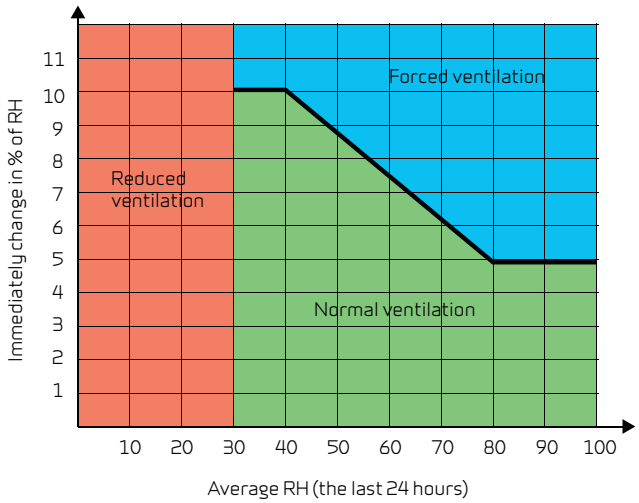
Nilan's humidity control automatically adapts to the needs of the family or the building.

The intelligent CTS 700 control unit does not need to have a set level input for air humidity (RH) to control the air exchange. By using the integrated humidity sensor, the control unit calculates the average level itself for the last 24 hours. The average level provides a basis for deciding whether to change the air exchange if the air humidity fluctuates.

This ensures that the unit always runs at its most efficient, based on the actual air humidity level and not on a theoretical one.

This helps save energy because it automatically adapts to the requirements in the home. Whether a large family or a single person is living in the building has a considerable influence on how much humidity is produced.

The unit also adjusts automatically to summer and winter level.



If the air humidity changes by more than 5-10% in relation to the average level, the unit responds with a higher rate of air exchange accordingly.

At an air humidity below 30% is reduced ventilation stp activated (adjustable between 15 and 45%)

DELIVERY AND HANDLING

Transport and storage

Compact P comes in factory packaging that protects it during transport and storage.

Compact P must be stored in a dry place in its original packaging until installation. The packaging should only be removed immediately prior to installation.

Lifting cover

Lifting cover for Compact P makes it possible to lift Compact P of the pallet without making any heavy lifts and transport the system around in the home. Detach the filter box and the system fits under an average inner door.

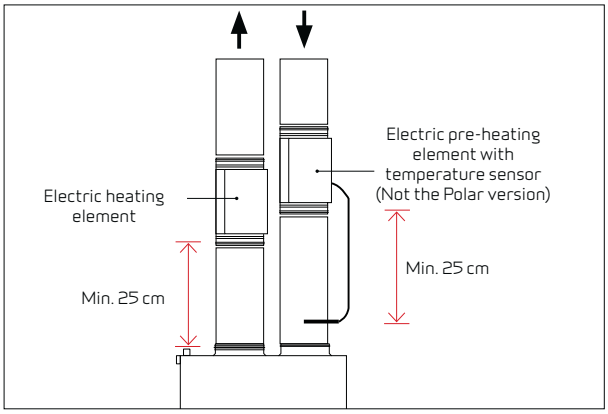
Installation conditions

During installation, future service and maintenance should be taken into account. We recommend a minimum gap in front of the unit of 60 cm.

The unit must be installed level for the sake of the condensate drain.

Installation of electric heating element

Electric heating elements (accessories) are fitted in the duct. The heating element must be insulated using fire-resistant insulation material. The electric heating element must be connected by an authorised electrician.



COMPACT P GEO 3/6/9

Product description

Compact P GEO offers the same benefits and functions as Compact P, but additionally has an integrated geothermal pump, with connection to waterborne underfloor heating or low-temperature central-heating radiators.

The heat pumps are available in two sizes: GEO 3 (0.5 - 3 kW), GEO 6 (1 - 6 kW) and GEO 9 (1,5 - 9 kW). The variable compressor makes Compact P GEO a far more efficient and energy-friendly solution than traditional heat pumps that often have compressors with a constant output.

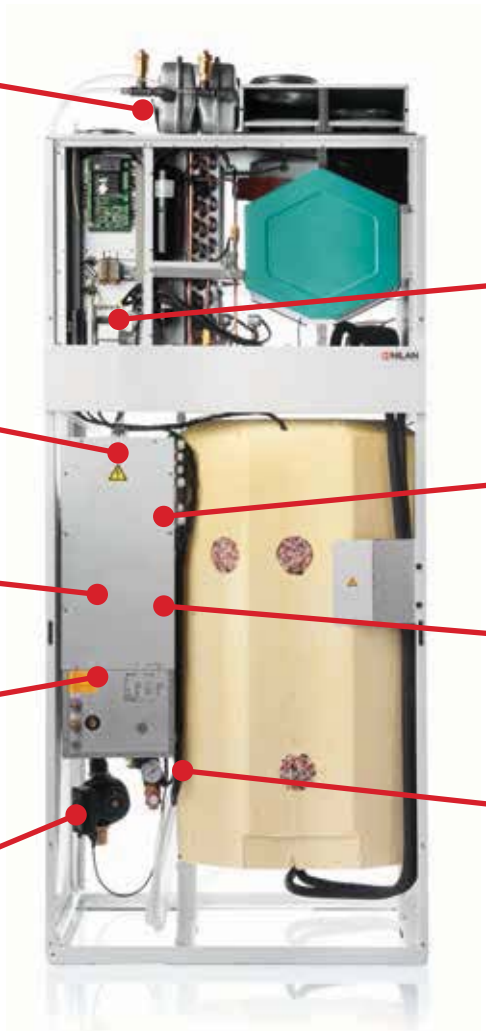
As the output is subject to variable regulation, the heat pump never uses more energy than necessary, which gives a very high SCOP.

- With GEO 3, a SCOP of 5.17 is achieved
- With GEO 6, a SCOP of 5.15 is achieved
- With GEO 9, a SCOP of 5.49 is achieved

SG Ready

Variable Compressor

8-litre expansion tank for brine and the central heating circuit.



GEO 3/6/9 is controlled via the same CTS 700 touch panel as is used for Compact P.

2 kW electrical completion. Ensures indoor heating in very cold periods.

Integrated in Compact P.

Hermetically-sealed cooling circuit. Installation without the help of a refrigeration fitter.

Low-noise components ensure a product that does not have an adverse impact on the surroundings.

An inverter-controlled DC compressor ensures a variable output and low energy consumption.

Installed manometer and safety valve for the brine circuit.
Also included for the central heating circuit.

Integrated circulation pump for the brine circuit.

Technical specifications	GEO 3	GEO 6	GEO 9
Dimensions (W x D x H)	Integrated in Compact P 550 x 300 x 1,100 mm	Integrated in Compact P 580 x 300 x 1,100 mm	Integrated in Compact P 580 x 300 x 1,100 mm
Weight	55 kg	55 kg	56 kg
Control	CTS 700	CTS 700	CTS 700
Compressor variable speed	Yes (20-100%)	Yes (20-100%)	Yes (20-100%)
Installation site, room temperature	5°C → 35°C	5°C → 35°C	5°C → 35°C
Supply voltage and connection	400/230V 3L+N+PE, 50Hz	400/230V 3L+N+PE, 50Hz	3x400+PE, 50Hz
Fuse size	13A/20A	16A	16 A
Start current, $I_{max,}$ Start	14A	14A	15 A
Standby electricity consumption	2.5 W	2.5 W	2.5 W
Supplementary electrical heating	2 kW	2 kW	2 kW
Rated output, brine pump (max/min). A pump	87/6 W	87/6 W	87/6 W
Rated current, brine pump (max/min). A pump	0.7/0.06 A	0.7/0.06 A	0.7/0.06 A
Refrigerant	R410A	R410A	R410A
Refrigerant filling	1.1 kg	1.4 kg	1.4 kg
Pressostat low pressure (on/off)	2.2/3.4 barG	2.2/3.4 barG	2.2/3.4 barG
Pressostat high pressure (on/off)	42/33 barG	42/33 barG	42/33 barG
Antifreeze	Ethylene glycol/water Ethanol/water	Ethylene glycol/water Ethanol/water	Ethylene glycol/water Ethanol/water
Antifreeze, brine	-20°C → -18°C	-20°C → -18°C	-20°C → -18°C
Design pressure brine/central heating side	4/4 bar	4/4 bar	4/4 bar
Opening pressure safety valve brine/central heating side	3.5/2.5 bar	3.5/2.5 bar	3.5/2.5 bar
Expansion vessel brine/central heating side	8/8 litres	8/8 litres	8/8 litres
Booster expansion vessels	0.5 barG	0.5 barG	0.5 barG
Environmental pressostat brine, leak alarm (on/off)	0.6/1.1 barG	0.6/1.1 barG	0.6/1.1 barG
Heat output P_H with variable compressor	0.5-3 kW	1-6 kW	1,5-9 kW
Central heating, flow temperature, operating area	25°C → 45°C	25°C → 45°C	25°C → 45°C
Brine temperature to evaporator, operating area	-5°C → 20°C	-5°C → 20°C	-5°C → 20°C
Central heating pressure loss, condenser	10 kPa/0.14 l/s	15 kPa/0.29 l/s	15 kPa/0.29 l/s
Central heating connection	3/4"	3/4"	3/4"
Brine pressure loss evaporator	10 kPa/0.19 l/s	15 kPa/0.39 l/s	15 kPa/0.39 l/s
Brine connection	1"	1"	1"
COP 0/35°C at max. $P_{H,}$ in accordance with EN14511:2012 with brine/water dT=3/5°C*	4.5 (P_H max. 3 kW)	4,27 (P_H max. 6 kW)	4,19 (P_H max. 9 kW)
EHPA tested and approved	N/A	Yes*	
SCOP-tested in accordance with EN14825:2012**	5.17	5,15	5,49
Sound output level L_{WA} at 100% heat output 0/35°C	≤ 47dB(A)	≤ 51 dB(A)	≤ 51 dB(A)
Sound output level L_{WA} at 50% heat output 0/35°C	≤ 45 dB(A)	≤ 44 dB(A)	≤ 44 dB(A)
Sound pressure level L_{pA} in 1 m at 100% heat output 0/35°C	≤ 36 dB(A)	≤ 40 dB(A)	≤ 40 dB(A)
Sound pressure level L_{pA} in 1 m at 50% heat output 0/35°C	≤ 34 dB(A)	≤ 33 dB(A)	≤ 33 dB(A)

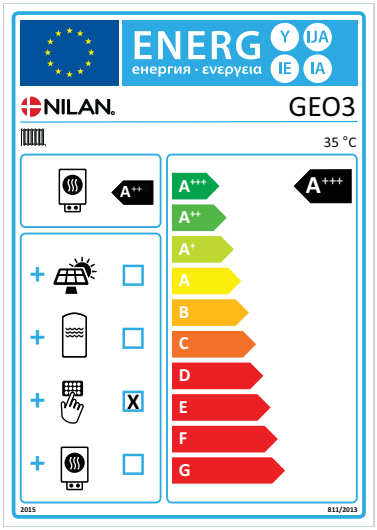
*) Complies with "EHPA Test Regulations vers. 1.4, 2011-02-01" with max. output 3 kW at 0/35°C in accordance with EN14511:2012

**) SCOP (Seasonal COP) is for "low temperature use, average climate, defined flow"

Sound data in accordance with EN12102 and EN ISO 9614-2

TECHNICAL PARAMETERS

GEO 3 Heating pump system for space heating



Model	GEO 3
Air-to-water heat pump	No
Water-to-water heat pump	No
Brine-to-water heat pump	Yes
Low-temperature heat pump	Yes
Equipped with a supplementary heater	Yes
Heat pump combination heater	No
Temperature control:	
Model	CTS700
Class	2
Contribution to seasonal space heating energy efficiency	2%

Item	Symbol	Value	Unit
Rated heat output	*Prated*	3,44	kW
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature of T_j			
T_j = -7 °C	*Pdh*	3,04	kW
T_j = +2 °C	*Pdh*	1,88	kW
T_j = +7 °C	*Pdh*	1,26	kW
T_j = +12 °C	*Pdh*	1,02	kW
T_j = bivalent temperature	*Pdh*	3,03	kW
T_j = operation limit temperature	*Pdh*	0	kW
For air-water-heating pumps Tj = -15 °C (if TOL < -20 °C)	*Pdh*		kW
Bivalent temperature	T_{biv}	-7	°C
Cycling interval capacity for heating	*Pcych*		kW
Degradation co-efficient	*Cdh*	0,97	

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	η_s	208	%
Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature T_j			
T_j = -7 °C	*COPd*	4,66	
T_j = +2 °C	*COPd*	5,29	
T_j = +7 °C	*COPd*	5,63	
T_j = +12 °C	*COPd*	5,82	
T_j = bivalent temperature	*COPd*	4,61	
T_j = operation limit temperature	*COPd*	0	
For air-to-water heat pumps: Tj = -15 °C (if TOL < -20 °C)	*COPd*		
For air-to-water heat pumps: Operation limit temperature	*TOL*		°C
Cycling interval efficiency	*COPcyc*		
Heating water operating limit temperature	*WTOL*	52	°C

Power consumption in modes other than active mode			
Off mode	P_{OFF}	0,003	kW
Thermostat off-mode	P_{TO}	0,010	kW
Standby mode	P_{SB}	0,010	kW
Crankcase heater mode	P_{CK}	0,000	kW

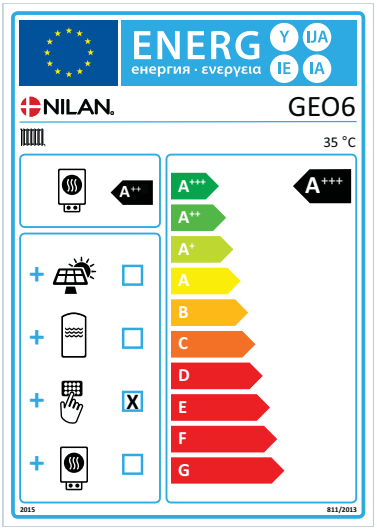
Supplementary heater			
Rated heat output	*Psup*	2	kW
Type of energy input	Electrical		

Other items			
Capacity control:	Variable compressor Variable indoor temperature adjustment		
	Fixed indoor water flow Fixed outdoor water flow		
Sound power level, indoors	L_{WA}	47	dB
Emissions of nitrogen oxides	Q_{HE}	931	kWh

For air-to-water heat pumps: Rated air flow rate, outdoors			m^3/h
For water-/ brine-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger		0,518	m^3/h

GEO 6 Heating pump system for space heating

Model	GEO 6
Air-to-water heat pump	No
Water-to-water heat pump	No
Brine-to-water heat pump	Yes
Low-temperature heat pump	Yes
Equipped with a supplementary heater	Yes
Heat pump combination heater	No
Temperature control:	
Model	CTS700
Class	2
Contribution to seasonal space heating energy efficiency	2%



Item	Symbol	Value	Unit
Rated heat output	*Prated*	6,01	kW
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature of T_j			
T_j = -7 °C	*Pdh*	5,29	kW
T_j = +2 °C	*Pdh*	3,32	kW
T_j = +7 °C	*Pdh*	2,09	kW
T_j = +12 °C	*Pdh*	1,30	kW
T_j = bivalent temperature	*Pdh*	6,01	kW
T_j = operation limit temperature	*Pdh*	0	kW
For air-water-heating pumps Tj = -15 °C (if TOL < -20 °C)	*Pdh*		kW
Bivalent temperature	T_{biv}	-10	°C
Cycling interval capacity for heating	*Pcych*		kW
Degradation co-efficient	*Cdh*	0,99 - 1	

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	η_s	208	%
Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature T_j			
T_j = -7 °C	*COPd*	4,48	
T_j = +2 °C	*COPd*	5,22	
T_j = +7 °C	*COPd*	5,69	
T_j = +12 °C	*COPd*	5,30	
T_j = bivalent temperature	*COPd*	4,27	
T_j = operation limit temperature	*COPd*	0	
For air-to-water heat pumps: Tj = -15 °C (if TOL < -20 °C)	*COPd*		
For air-to-water heat pumps: Operation limit temperature	*TOL*		°C
Cycling interval efficiency	*COPcyc*		
Heating water operating limit temperature	*WTOL*	?	°C

Power consumption in modes other than active mode

Off mode	P_{OFF}	0,002	kW
Thermostat off-mode	P_{TO}	0,024	kW
Standby mode	P_{SB}	0,002	kW
Crankcase heater mode	P_{CK}	0,000	kW

Supplementary heater

Rated heat output	*Psup*	2	kW
Type of energy input	Electrical		

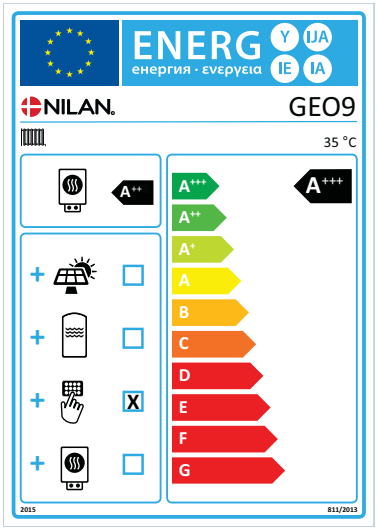
Other items

Capacity control:	Variable compressor Variable indoor temperature adjustment		
	Fixed indoor water flow Fixed outdoor water flow		
Sound power level, indoors	L_{WA}	51	dB
Emissions of nitrogen oxides	Q_{HE}	2386	kWh

For air-to-water heat pumps: Rated air flow rate, outdoors			m^3/h
For water-/ brine-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger		1,041	m^3/h

GEO 9 Heating pump system for space heating

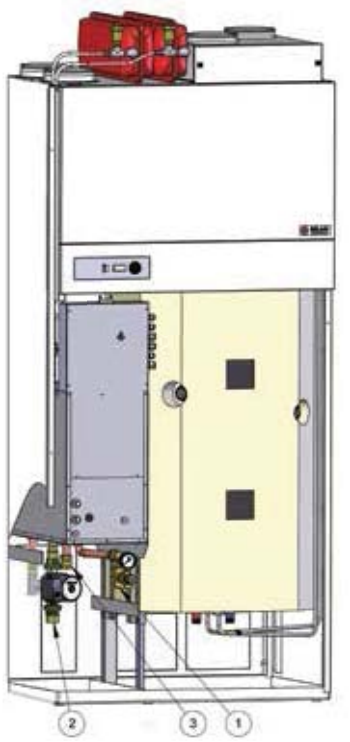
Model	GEO 9
Air-to-water heat pump	No
Water-to-water heat pump	No
Brine-to-water heat pump	Yes
Low-temperature heat pump	Yes
Equipped with a supplementary heater	Yes
Heat pump combination heater	No
Temperature control:	
Model	CTS700
Class	2
Contribution to seasonal space heating energy efficiency	2%



Item	Symbol	Value	Unit
Rated heat output	*Prated*	9,05	kW
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature of T_j			
T_j = -7 °C	*Pdh*	8,01	kW
T_j = +2 °C	*Pdh*	4,87	kW
T_j = +7 °C	*Pdh*	3,13	kW
T_j = +12 °C	*Pdh*	1,39	kW
T_j = bivalent temperature	*Pdh*	9,05	kW
T_j = operation limit temperature	*Pdh*		kW
For air-water-heating pumps Tj = -15 °C (if TOL < -20 °C)	*Pdh*		kW
Bivalent temperature	T_{biv}	-10	°C
Cycling interval capacity for heating	*Pcych*		kW
Degradation co-efficient	*Cdh*	0,94-0,99	
Power consumption in modes other than active mode			
Off mode	P_{OFF}	0,010	kW
Thermostat off-mode	P_{TO}	0,015	kW
Standby mode	P_{SB}	0,010	kW
Crankcase heater mode	P_{CK}	0,010	kW
Other items			
Capacity control:	Variable compressor Variable indoor temperature adjustment		
	Fixed indoor water flow Fixed outdoor water flow		
Sound power level, indoors	L_{WA}		dB
Emissions of nitrogen oxides	Q_{HE}		kWh

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	η_s	232	%
Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature T_j			
T_j = -7 °C	*COPd*	4,42	
T_j = +2 °C	*COPd*	5,33	
T_j = +7 °C	*COPd*	5,96	
T_j = +12 °C	*COPd*	5,96	
T_j = bivalent temperature	*COPd*	4,16	
T_j = operation limit temperature	*COPd*		
For air-to-water heat pumps: Tj = -15 °C (if TOL < -20 °C)	*COPd*		
For air-to-water heat pumps: Operation limit temperature	*TOL*		°C
Cycling interval efficiency	*COPcyc*		
Heating water operating limit temperature	*WTOL*		°C
Supplementary heater			
Rated heat output	*Psup*		kW
Type of energy input	Electrical		
For air-to-water heat pumps: Rated air flow rate, outdoors			m^3/h
For water-/ brine-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger		1,53	m^3/h

DIMENSIONS AND FUNCTION

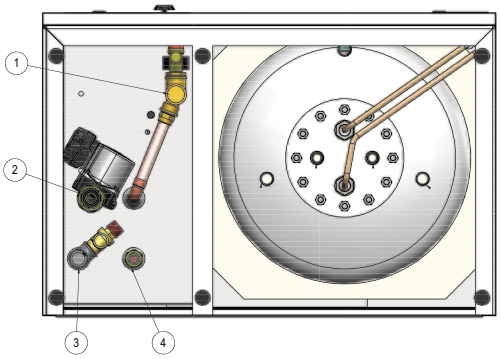


Front

1. Return flow to brine 1"
2. Flow from brine 1"
3. Return flow, central heating 3/4"

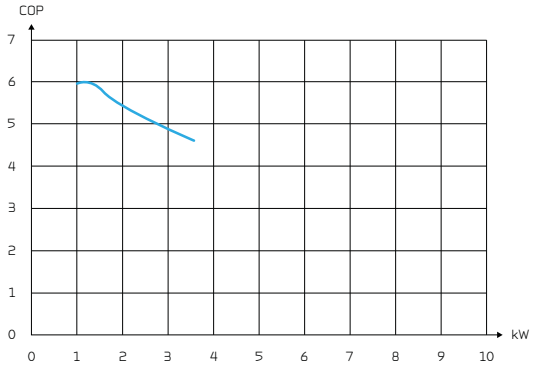
Base

1. Return flow to brine 1"
2. Flow from brine 1"
3. Flow from central heating 3/4"
4. Return flow central heating 3/4"



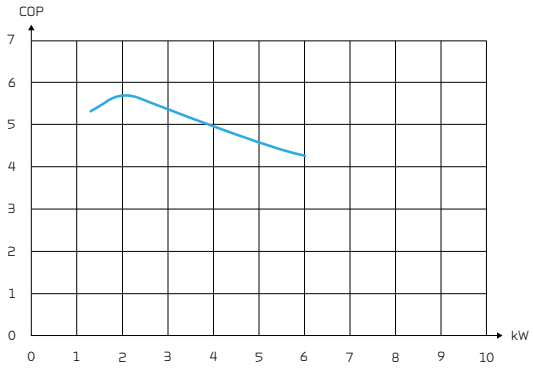
COP - GEO 3

Tested in accordance with EN14825



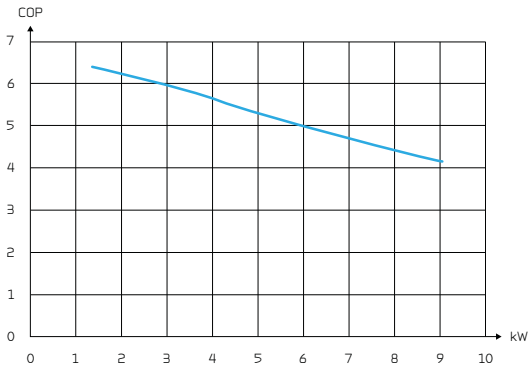
COP - GEO 6

Tested in accordance with EN14825



COP - GEO 9

Tested in accordance with EN14825



FUNCTIONS

Geothermal pump

GEO 3/6/9 is a geothermal pump that recovers energy from the ground to heat the home, and is not affected by periods of very cold weather. Heat is distributed in the home via Compact P for underfloor heating or low-energy radiators.

The GEO 3/6/9 interior section is integrated in the Compact P casing, giving a neat and tidy installation in the home.

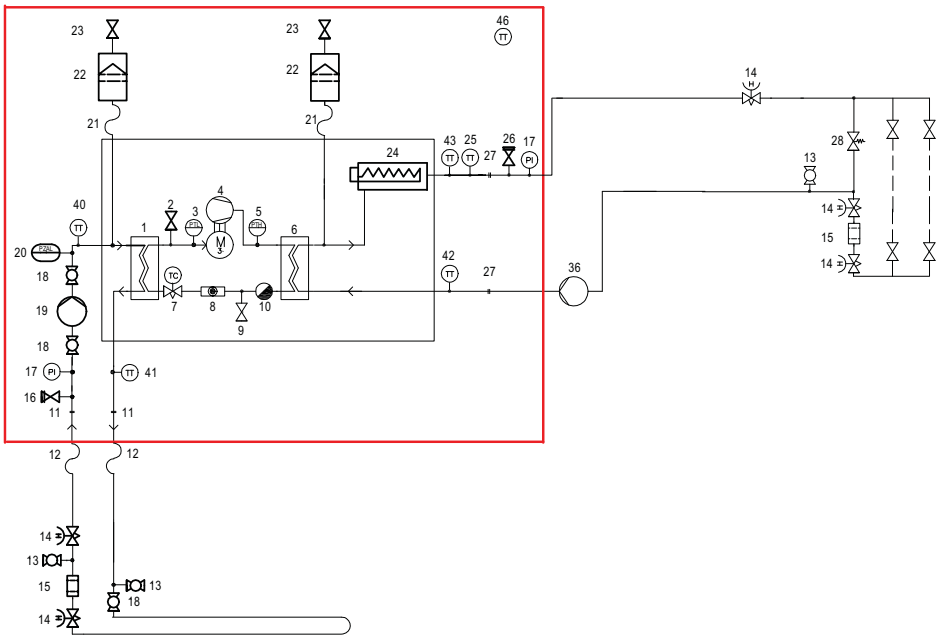
The heat pump has a hermetically-sealed cooling circuit and can therefore be installed without requiring a cooling technician.

Passive cooling

By adding a external heat exchanger, Compact P GEO 3/6/9 can also cool the home in the summer, if required.

The cold brine water is led through an external heat exchanger that cools the water in the central heating system.

Compact P GEO



1 Evaporator
2 Service valve for low pressure
3 Low-pressure pressostat
4 Compressor
5 High-pressure pressostat
6 Condenser
7 Expansion valve
8 Sight glass with humidity indicator
9 Service valve for high pressure
10 Combi filter
11 Connection 1"
12 Flexihose 1"
13 Feed tap
14 Shut-off valve
15 Dirt filter
16 Safety valve 3,5 bar
17 Manometer
18 Ball valve
19 Circulation pump 130 mm
20 Pressure control 0,5/1,1 bar
21 Flexihose 10 mm
22 Expansion tank 8 L
23 Automatic control vent 3/8"
24 Electric cartridge 2 kW
25 Temperature sensor T18
26 Safety valve 2,5 bar
27 Connection 3/4"
28 Overcurrent vavle
36 Circulation pump
40 Temperature sensor T13
41 Temperature sensor T14
42 Temperature sensor T16
43 Temperature sensor T17
46 Temperature sensor T20 (outdoor sensor)

SHW warmwater-tank connected to Compact P GEO