Geyser 2/HT HWS LN 26

Configured unit accessories

LN - Low noise

1PS - One user-side pump with tank

1R - One pump recovery side

RA - Anti-freeze heaters

PFP - System pump with Pulse function

A43N - 400/3+N/50 power supply

RMMT - Maximum and minimum voltage relay

SERI - RS485 serial interface

SOFT - Electronic soft-starter

VEC - EC fans

GCA - Anti-legionella cycle management

MM2 - Miniboss M (2 units management)

AG - Rubber vibration dampers

The image does not refer to the configured unit

General description

New series of dedicated heat pumps with hermetic scroll compressors, with steam injection.
Refrigeration capacity (A35; W7): 6 to 73 kW
Heating capacity (A7; W45): 6 to 78 kW
Unit in compact, air-condensed, high energy efficiency heat pump with hermetic scroll compressors, axial fans and plate evaporators. Refrigerant fluid: R410A.

Multifunctional Unit

MULTIFUNCTIONAL HEAT PUMP
Compact,water-condensed, high energy efficiency, multifunctional units with hermetic scroll compressors, axial fans and plate evaporators.
Refrigerant fluid: R410A.
The unit in this set-up has two heat exchangers: a system side one, for air conditioning and heating, and one dedicated exclusively to domestic water production.
On the system side heat exchanger, the unit can produce hot water or cold water to meet the heating and cooling requirements of the building depending on the seasons.
On the heat exchanger dedicated to domestic hot water, the unit produces high temperature water to be sent to a storage tank outside the machine. This tank has been selected and sized according to the requirements of the system.
Depending on the season, the unit works with different modes: the change through the various operating modes (within the season) is carried out automatically through the reading of the temperature probes and the set points. Switching times and logics have been designed to ensure the maximum efficiency and reliability of the system.
This configuration must obligatorily be associated with a suitably sized boiler in which to store high temperature water. The boiler must have a well for insertion of the domestic hot water probe, placed at the top, through which the controller of the unit monitors the need to produce domestic hot water.
Summer operation
There are three summer operating modes:
- Chiller mode: the unit only produces chilled water for the system.
- Chiller mode with contemporaneous production of domestic hot water: the unit produces chilled water for the system and domestic hot water at the same time. Recovery of heat for domestic hot water production is total.
- Heat pump mode for domestic hot water production: when there is no cold load and when requested by the domestic hot water probe, the unit heats the water inside the storage tank for domestic hot water, using the finned pack coil as evaporator. The use of hot outside air as a heat source ensures that extremely high COPs will be obtained.
The change from one mode to another takes place fully automatically according to a priority logic in domestic hot water production and, when there is a simultaneousness of loads, by recovering condensation energy for domestic hot water production.
Winter operation
There are two winter operating modes:
- Heat pump mode for heating: the unit produces hot water at the system-side heat exchanger for heating
- Heat pump mode for domestic hot water production: produces high temperature hot water at the connected heater exchanger of the domestic hot water storage tank. The change from one mode to another takes place fully automatically according to a priority logic in domestic hot water production. Heat pump mode for domestic hot water production: produces high temperature hot water at the connected heater exchanger of the domestic hot water storage tank. The change from one mode to another takes place fully automatically according to a priority logic in domestic hot water production.

Specifications

Structure

Made of galvanized sheet-iron coated with polyester powder at 180°C, which makes it highly resistant to weather conditions.
The panels can be removed easily to allow full access to internal components.

7035

All bodies have a Condensate drain pan with drain.

The compressor compartment of this unit is fully soundproofed with sound absorbing material and soundproofing material.

Compressors

Hermetic scroll compressors, connected in tandem if there are two, complete with thermal overload protection included in the electric motor windings, crankcase heater and rubber vibration damping supports. The compressor used in this series is specifically designed to operate in heat pump mode. Optimization of the compression ratio at high values allows higher efficiency to be obtained if compared with conventional scroll compressors.

Size 13 models are provided with liquid injection compressor. Liquid injection allows the unit to operate in heat pump mode at very low external temperatures and to produce high temperature water at the same time. There is therefore a further circuit for injection of liquid to the compressor.

Coils

Consists of a coil with copper tubes and aluminium fins having a large exchange surface with fin pitch sized to maximize heat exchange and reduce acoustic impact. The fin space of the heat exchanger has been increased to allow the unit to work at very low temperatures and at high humidity levels. At the base of the heat exchanger there is a subcooler and a further refrigerant circuit that prevents ice formation in the lower part of the coil and facilitates the flow of condensation during defrosting. The effects of the subcooler are: a reduced number of defrosting sessions and the certainty of having a clean heat exchanger at the end of defrosting.
There is a metal mesh to protect the finned pack.

Fans

Axial flow fans directly coupled to the electric motor, made of plastic material with the blade profile having WINGLETS, a special shape at the ends of the blades that allows noise reduction and increased aeraulic performance. The control manages the speed of the fans through a phase cutting Fan speed regulator, in order to optimize operating conditions and efficiency, and allow the unit to operate
in heat pump mode even for high external temperatures. This control also has the effect of reducing the noise level of the unit: in fact, the typical conditions under which the control will be modulating the speed of the fans are those of the night, spring and autumn. This ensures that,
whenever there is a chance, the machine will reduce the speed of the fans, and therefore the noise, to the minimum. The fans are axial flow fans, directly coupled to a 6-pole electric motor, with protection rating of IP 54, and with shaped nozzles and safety guard in conformity with UNI EN 294.

User-side heat exchanger

made of stainless steel AISI 316 insulated with a shell of closed-cell foam material to reduce heat loss.
The use of plate heat exchangers allows us to:
- Achieve higher COP/EER;
- Reduce the amount of refrigerant in the circuit;
- Decrease the size and weight of the unit;
- Facilitate maintenance work.

Each heat exchanger is provided with a temperature probe for freeze protection and a probe for measuring the incoming water.

Flow switch

Each unit is provided with user-side paddle flow switch supplied as standard with it.

Total heat recovery exchanger

Braze-welded stainless steel AISI 316 plate heat exchanger insulated with a shell of closed-cell foam material that reduces its heat loss and prevents formation of condensation. Specially designed for domestic hot water production.

Refrigerant circuit

The circuit includes:

charging connections in the liquid and suction line

- liquid sight glass

dehydrator filter

pressure transducer

- high and low pressure switches

solenoid valve

non-return valves

two thermostatic expansion valves (one for operation in heat pump mode and the other for operation in chiller mode) having external pressure equalization

safety valve (with the exception of sizes 7, 9 and 11)

suction separator (from size 22)

safety valve

liquid receiver

In addition to the components of the basic version, the /HWS unit includes:
- temperature probe to be positioned on the domestic hot water storage tank. For domestic hot water production, the controller requires this accessory: it is a temperature probe with 6 m of cable placed in a special well of the tank for domestic hot water production. For correct positioning, please read the section entitled ”How to install a heat pump”.
- electronic thermostatic valve (replaces the two mechanical thermostatic valves) electronic thermostatic valve (replaces the two mechanical thermostatic valves)

Electrical control panel

The circuit includes:

Main automatic circuit breaker

Fuses to protect the power circuits

Fuses to protect the auxiliary circuits

Fan Fan speed regulator for saturation pressure control

Pump relay or overload cutout and contactor for units with user-side hydraulic module

- General alarm clean contacts

to control the following functions

Summer/winter selection by digital input

- Water temperature control, with inlet control
- Freeze protection
- Compressor timings
- High pressure alert management to prevent the unit from stopping in many cases
- Alarm signalling
- Alarm reset
- Digital input for remote ON/OFF
- Display of the following on the display:
    - --> Outgoing water temperature
    - --> Temperature and differential set points
    - --> Description of alarms
    - --> High pressure temperature
    - --> Compressor and pump operation hour meter
    - --> Automatic management of domestic hot water
    - --> Easy defrosting

Standard power supply [V/ph/Hz]

230V/1~/50Hz for size 7; 400V/3N~/50Hz from size 9

For single-phase models, a three-phase power supply is available as an accessory. For some three-phase models, a singe-phase power supply is available as an accessory.

CONTROLS AND SAFETY DEVICES

All the units are fitted with the following control and safety components:
- high pressure switch with manual reset
- high pressure safety device with automatic reset, for a limited number of occurrences, managed by the controller
- low pressure safety device with automatic reset and limited tripping managed by the controller
- high pressure safety valves
- antifreeze probe at the outlet of the user-side heat exchangers
- differential pressure switch already fitted on the user-side heat exchangers
- overtemperature protection for compressors and fans
overtemperature protection for compressors and fans

- High pressure switch with automatic reset and limited interventions managed by the control;

- Low pressure switch with automatic reset and limited interventions managed by the control;

- High pressure safety valve (with the exception of sizes 7, 9 and 11);

- Protection against overtemperature for compressors;

- Condensation pressure control by means of Fan speed regulator for operation with low external temperatures;

- Evaporation pressure control by means of Fan speed regulator for operation with high external temperatures in domestic hot water production or recovery mode.

Testing

All the units are factory-tested and supplied complete with oil and refrigerant.

/1PS

The unit comprises a circulator from size 7 to 17 or a circulation pump from size 22, insulated storage tank

/1R

with a pump for the domestic hot water side supplied with the unit. Units without the module are provided with an OK signal for management of an external pump. The pump for the domestic hot water must be installed inside a technical compartment and suitably protected from low temperatures and from the danger of freezing of the relevant hydronic circuit.

Other standard features

Remote ON-OFF by digital input

This function consists of a remotely operable contact that allows switching on and off of the machine through a signal that can be brought inside the building or controlled by a BMS (Building Management System)

Summer/winter selection by digital input

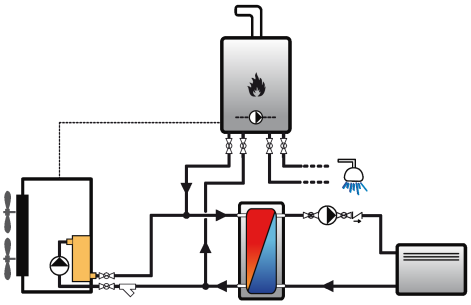
Fitted as standard on all heat pumps. When the unit is switched on, it is always necessary to set an operating mode (heat pump or chiller). This remotely operable contact can be used to change the operating mode even from inside the building and without it being necessary to directly access the microprocessor control.

Easy defrosting

The control manages defrosting according to a variable intervention threshold, depending on the pressures inside the unit and external air temperature. By putting together all this information, the control can identify the presence of ice on the coil and activates the defrosting sequence
only when necessary, so as to maximize the energy efficiency of the unit.
Dynamic management of the defrosting threshold ensures that for external air temperatures below -5°C, when absolute air humidity is very low, defrosting is carried out only when the ice on the coil lowers its performance.

Auxiliary heat source management

The controller can manage an external heat source that, depending on the type of hydraulic connection, can be additional or used as backup. In the drawing shown below, for example, the boiler will be a backup to the heat pump.
Activation of the auxiliary heat source takes place when the external air temperature falls below a threshold that can be set with the control and when the heat pump alone is insufficient to meet the load. Activation takes place by closing a clean contact.
It is also possible to set the unit so that the controller switches off the compressors when the unit is operating in heat pump mode and the external air temperature falls below a minimum set temperature: the controller will stop the compressors before the unit goes into low pressure alarm, so avoiding having to manually restart the machine.
This function will be particularly useful when the heat pump is installed in an area where the external air temperature will certainly fall below the minimum temperature allowed by the operating limits (in accordance with the set set point). When the external
air temperature returns above the set threshold temperature, the unit will automatically resume operation without it being necessary to do anything. For units equipped with integrated pump, the pump will always be kept running so as to prevent ice formation and ensure correct reading of the temperature and antifreeze safety probes at all times.
The stopping temperature must be set based on the highest set point temperature and in accordance with what is allowed by the operating limits of the machine. A different stopping temperature from the default temperature can be set, provided that it is compatible with the operating limits of the unit.
If the unit must also be used for domestic hot water production, the stopping temperature must consider the highest water set point, and the allowed the operating limits.



The standard programming has:
- the heating set point set to 40/45°C with a stopping temperature of -20°C
the heating set point set to 40/45°C with a stopping temperature of -20°C

CONFIGURED UNIT ACCESSORIES DESCRIPTION

Anti-freeze heaters

This accessory consists of heaters inserted on the user-side heat exchanger to prevent damage to the hydraulic components due to the formation of ice during periods when the machine is stopped. The power of the anti-freeze heaters is only a few tens of watts depending on the model of unit, namely what is sufficient to prevent breakage of the components. The control monitors (even when the unit is on standby) the heat exchanger outlet probe and when this measures a water temperature below or equal to 5°C (or 2°C below the set point temperature, with differential of 1°C), it switches on the pump (if present) and starts the anti-freeze heater. If the temperature of the outgoing water reaches 4°C (or 3°C below the set point) the anti-freeze alarm will also be triggered; this stops the compressor while keeping the heaters active.

User-side pump with Pulse function

As standard, the unit is set to keep the system-side circulation pump on all the time, even when the set point temperature is reached.
But when the unit is provided with this accessory, on reaching the set point, the controller will switch off the pump and start it again at regular intervals for a sufficient time to measure the water temperature. If the controller verifies that the water temperature is still in set point condition, it will
switch off the pump again. Otherwise the controller will start the compressors again to meet the requirements of the system. This accessory therefore allows electrical absorption due to pumping to be drastically reduced, especially in spring and autumn when the load is extremely low.
The application of this accessory requires the obligatory presence of the “Anti-freeze heaters” accessory.

Maximum and minimum voltage relay

This device carries out continuous control of the supply voltage of the unit and checks that it is always within an allowable range. If the voltage value stabilizes above or below this range, the device will stop the unit to prevent damage to the electric motors. This device will carry out phase sequence control.

Additional RS485 serial card

RS485 serial card for connection of the unit to an external supervisor via ModBus protocol.
This card is in addition to the RS485 serial connection with ModBus protocol present as standard.

EC fans

The units can be combined with the innovative direct current EC axial fans (Electronically Commutated) with electronically commutated brushless motor. These motors with permanent magnet rotor guarantee very high efficiency levels for every operating condition and
allow a 15% saving per fan to be obtained. Also, through a 0-10V analogue signal sent to each fan, the microprocessor allows condensation control by continuous control of air flow as the external air temperature changes and a consequent reduction in noise emission.

Anti-legionella cycle management

Allows management through a clock inside the electrical control panel: Time/Day/Week. During the selected period, it will be possible to change the set point on the hot water side to produce for example 60/65 [°C] suitable for neutralizing the bacterium.
The same result can be obtained through the accessory called “2 Pipes: Double set point by digital input on domestic hot water side - 4 Pipes: Double Set point by
digital input on hot side”. The set point change is carried out by an external supervisions system.

Miniboss M

In applications where there is:
- the need to ensure continuous operation of the system and there must therefore be redundancy with a reserve machine
- a system that will be started by parts and that will therefore require a gradual increase in installed power
- not the physical space to install a single unit that can guarantee all the capacity, but where several smaller units can be installed
- in general, the need to combine several units and coordinate their operation and rotation, the Miniboss accessory can be used, which is a control panel supplied with the unit. This allows several units connected in parallel and coordinated by a single supervisor to be managed rationally and efficiently.

The Miniboss M allows up to 8 units in parallel to be managed. The main functions are:
- to manage units with HWS configurations
- to manage units with the “automatic management of domestic hot water” logic
- to manage systems with a hot/cold tank for heating/conditioning and a hot tank for domestic hot water production

In addition to what is also carried out by the Miniboss S,
- the set point of the system
- the set point of the domestic hot water
- to use a climatic curve for compensation of the system set point
- the summer/winter selection of all the machines
- the ON/OFF of individual units or of the entire system
- the switching of three-way valves
- to manage the operation of pumps outside the units

This accessory is supplied in an electrical control panel supplied with the unit (to be installed in a technical compartment); it should be present on only one of the machines connected in parallel and all the connected units must have the same configuration.
When ordering, it is obligatory to specify the number of units that will have to be managed in order to allow correct programming of the supervisor. Also, the hydraulic circuit that connects the units must obligatorily comply with one of the following diagrams.
For further information about use, it is necessary to refer to specific documentation. to manage the operation of pumps outside the units
This accessory is supplied in an electrical control panel supplied with the unit (to be installed in a technical compartment); it should be present on only one of the machines connected in parallel and all the connected units must have the same configuration.
When ordering, it is obligatory to specify the number of units that will have to be managed in order to allow correct programming of the supervisor. Also, the hydraulic circuit that connects the units must obligatorily comply with one of the following diagrams.
For further information about use, it is necessary to refer to specific documentation.

Rubber anti-vibration mounts

These are supplied as a separate package from the unit and must be installed on site following the assembly diagram supplied. They allow you to reduce the vibrations transmitted from the unit to the surface it is standing on.

ACCORDING TO EN14511		
Unit		Geyser 2/HT HWS LN
Model		26
Refrigerant fluid		R410A
Minimum partialization of the unit	%	100
Requested partialization	%	100
Compressors		
Type		Scroll
Number		1
Refrigerant circuits		1
Total oil charge	kg	3.4
Total refrigerant charge (estimated)	kg	9.1
Fans		
Type		AXIAL
Number		2
Rated absorbed power	kW	0.30
Rated absorbed current	A	1.70
Heat exchanger - User side		
Type		PL
Number		1
Water content	l	1.0
Heat exchanger - Heat recovery side		
Type		
Number		0
Water content	l	0.0
Dimensions		
Lenght	mm	1105
Width	mm	723
Height	mm	1850
Weight		
Net weight	kg	339
Hydraulic module - User side		
Number of pumps		1
Rated absorbed power	kW	0.45
Rated absorbed current	A	2.3
Maximum pressure hydraulic circuit	kPa	600
Storage tank	l	130.0
Hydraulic module - Heat recovery side		
Number of pumps		1
Rated absorbed power	kW	0.45
Rated absorbed current	A	2.3
Maximum pressure hydraulic circuit	kPa	600

Cooling conditions

Fluid - User side		Water
Fouling factor - User side	m² °C/W	0.0000440
Inlet water temperature - User side	°C	12.0
Outlet water temperature - User side	°C	7.0
External air temperature	°C	35.0
Height asl	m	0

Cooling performances

Cooling capacity	kW	23.5
Compressors absorbed power	kW	6.4
Total absorbed power (A1)	kW	6.9
Flow rate - User side	l/s	1.10
Pressure drops - User side	kPa	37
EER		3.42
Air flow rate	m3/h	13000
Available pressure	Pa	0
Fans absorbed power	kW	0.27
Fans absorbed current	A	1.70

Sound levels

Sound power (4)	dB(A)	69
Sound pressure (5)	dB(A)	38

Hydaulic module - User side: Cooling mode

Available pressure	kPa	130.02
Hydraulic circuit pressure drops	kPa	37.04
Pumps absorbed power	kW	0.3
Pumps absorbed current	A	2.3

(A1) Compressor, fans and pumps power

(4) Sound power levels calculated according to ISO 3744.

(5) Sound pressure levels measured at a distance of 10 metres from the unit in free field and directivity factor Q=2

Heating conditions

Inlet water temperature - User side	°C	50.0
Outlet water temperature - User side	°C	55.0
External air temperature	°C	-13.0
External Relative Humidity	%	90

Heating performances

Heating capacity	kW	18.1
Compressors absorbed power	kW	7.2
Total absorbed power (A1)	kW	7.7
Flow rate - User side	l/s	0.90
Pressure drops - User side	kPa	25
COP		2.36
Air flow rate	m3/h	13000

Available pressure	Pa	0
Fans absorbed power	kW	0.27
Fans absorbed current	A	1.70

Hydaulic module - User side: Heating mode

Available pressure	kPa	156.89
Hydraulic circuit pressure drops	kPa	25.21
Pumps absorbed power	kW	0.3
Pumps absorbed current	A	2.3

(A1) Compressor, fans and pumps power

Tap water conditions

Inlet water temperature - Heat recovery side	°C	47.0
Outlet water temperature - Heat recovery side	°C	52.0
External air temperature	°C	-13.0
External Relative Humidity	%	90

Tap water performances

Heating capacity	kW	17.7
Compressors absorbed power	kW	6.8
Total absorbed power (A1)	kW	7.2
Flow rate - Heat recovery side	l/s	0.89
Pressure drops - Heat recovery side	kPa	25
COP		2.45
Air flow rate	m3/h	13000
Available pressure	Pa	0
Fans absorbed power	kW	0.27
Fans absorbed current	A	1.70

Hydaulic module - User side: Tap water mode

Available pressure	kPa	157.47
Hydraulic circuit pressure drops	kPa	25.35
Pumps absorbed power	kW	0.3
Pumps absorbed current	A	

(A1) Compressor, fans and pumps power

Total recovery conditions

Fluid - Heat recovery side	m² °C/W	Water
Fouling factor - Heat recovery side	°C	0.0000440
Inlet water temperature - Heat recovery side	°C	12.0
Outlet water temperature - Heat recovery side	°C	7.0
Inlet water temperature - User side	°C	47.0
Outlet water temperature - User side	°C	52.0

Total recovery performances

Heating capacity	kW	29.8
Cooling capacity	kW	22.7
Compressors absorbed power	kW	7.9

Total absorbed power (R1)	kW	7.8
Flow rate - User side	l/s	1.06
Pressure drops - User side	kPa	35
Flow rate - Heat recovery side	l/s	1.47
Pressure drops - Heat recovery side	kPa	64
COP		2.89

Hydaulic module - User side: Heat recovery mode

Available pressure	kPa	135.60
Rps	1/s	
Hydraulic circuit pressure drops	kPa	34.58
Pumps absorbed power	kW	0.3
Pumps absorbed current	A	2.3

Hydaulic module - Heat recovery side: Heat recovery mode

Available pressure	kPa	70.96
Hydraulic circuit pressure drops	kPa	64.12
Pumps absorbed power	kW	0.4
Pumps absorbed current	A	2.3

(R1) Compressor and pumps power

ELECTRICAL DATA (Theoretical calculations)

Power supply	V/ph/Hz	400/3N~/50 ±10%
Control power supply	V/ph/Hz	230/1~/50

Electrical performances

Maximum absorbed power (E1)	kW	13.80
Maximum starting current - LRA	A	72.5
Full load current - FLA	A	34.7

(E1) Mains power supply to allow unit operation

Technical calculations may change according to calculation methods. Techical data may be revised.

SOUND LEVEL

Sound Level	63 [Hz]	125 [Hz]	250 [Hz]	500 [Hz]	1000 [Hz]	2000 [Hz]	4000 [Hz]	8000 [Hz]		
Lw [dB]	74	73	73	67	62	58	51	44	Lw_tot dB(A)	69
Lp [dB]	43	42	42	36	31	27	20	13	Lp_tot dB(A)	38

Reference conditions: External air temperature 35°C; user-side heat exchanger inlet-outlet water temperature 12-7°C.
Operation at rated speed with no fixture units.

Lw: Sound power levels calculated according to ISO 3744.
In particular Lw_tot is the only binding value.

Lp and Lp_tot: Sound pressure levels measured at a distance of 10 metres from the unit in free field and directivity factor Q=2.
Non binding values obtained from the sound power level