eneren

GSP / GSE / ENX / ENE

Water/water geothermal and hydrothermal units

USER MANUAL

HF61GJ0345D

GSP/GSE/ENX/ENE

WATER/WATER GEOTHERMAL AND HYDROTHERMAL UNITS

WARNING **CAREFULLY READ THIS MANUAL BEFORE USING THE UNIT.**

WARNING **Declaration of conformity**
The declaration of conformity is attached separately to the documents on board the unit, usually placed inside the circuit compartment.

Dear Customer,
Whilst thanking you for having chosen a product of ours, we are pleased to provide this manual for optimal use of our product for maximum comfort.

Please read the recommendations described in the following pages carefully and keep the manual available to personnel who will be responsible for managing and maintaining the unit.

Our company is at your disposal for any questions you may have both during the unit start-up phase or any other time.

Our Technical Department is at your disposal for any assistance and spare parts you may require, especially during routine or special maintenance.

Please find our contact details below for a more rapid service:

ENEREN S.r.l.
Viale Spagna, 31/33
35020 Tribano (Pd) ITALY
Tel + 39 049 9271513
Fax + 39 049 9588522
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START-UP INSTRUCTIONS

1 YOUR INSTALLATION

All the tips required for a perfect installation of the equipment can be found in the installation manual. It is important to place a net filter at all water circuit inlets. The filter must be made of stainless steel with a mesh that does not exceed 1 mm. See tables in section 7 for the size.

2 REQUIRED ACCESSORIES FOR A PROPER INSTALLATION OF THE UNIT

For the proper operation of the unit and for the validity of the warranty, the installation of the following hydraulic components will be necessary:

- Y-strainers in the inlet pipesto the unit
- Anti-vibration couplings in each pipe connected to the unit
- Appropriately dimensioned safety valves on each circuit of the system
- Appropriately dimensioned expansion vessels on each circuit of the system

3 CONNECTIONS

Here below are the minimum diameters for the pipes providing the connection to the units.

GSP/ENX	size	012	022	033	044
Minimum diameter of the connection pipe and filters	inches	1"	1"1/2	2"	2"

GSE/ENE	size	006	009	012	017	022	025	030	033	040
Minimum diameter of the connection pipe and filters	inches	1"	1"	1"	1"1/2	1"1/2	1"1/2	1"1/2	2"	2"

CONTENTS

CONTENTS

1 - GENERAL DESCRIPTION

1.1 PRECAUTIONS FOR USE

The operating rules contained in this manual are solely applicable for the units Model:

GSP/GSE/ENX/ENE

The instructions manual must be read and used as follows:
- every unit operator and maintenance technician must carefully read the entire manual and comply with that stipulated therein;
- the employer must ensure that the operator has the requirements to operate the unit and has carefully read the manual;
- read the instructions manual carefully and consider it an integral part of the unit;
- the instructions manual must be readily available to operating personnel and maintenance technicians;
- keep the manual throughout the life of the unit;
- make sure that any update is included in the text;
- hand the manual to any other user or subsequent owner of the unit;
- use the manual in such a way so as not to damage its content;
- do not, for any reason, remove, tear or rewrite parts of the manual;
- keep the manual away from humidity and heat;
- if the manual is lost or partially damaged and therefore the contents can no longer be read entirely, it is advisable to request a new manual from the manufacturer by communicating the code found on the cover or the serial number of the unit.

Pay utmost attention to the following symbols and their meaning. Their purpose is to highlight specific information such as:

WARNING **With reference to additional information or suggestions for the unit to be used correctly.**

DANGER **With reference to dangerous situations that could arise while using the unit, in order to guarantee personal safety.**

WARNING **With reference to dangerous situations that could arise while using the unit, in order to prevent damaging objects and the unit itself.**

1.2 INTRODUCTION

The operating rules described in this manual are an integral part of the unit supply.
These rules are also intended for the previously trained operator specifically to operate this type of unit and contain all the necessary and important information for operating safety and optimal, proper use of the unit.
Hurried and incomplete training leads to improvisation, which is the cause of many accidents.
The following recommendations must be read carefully before starting work and strictly complied with:
- the operator must always have the instructions manual at his disposal;
- carefully plan each operation;
- before starting work, make sure the safety devices function correctly and you have no doubts on how they work; otherwise, do not start-up the unit;
- strictly comply with the precautions regarding specific risks referred to in this manual;
- preventive and thorough maintenance guarantees constantly high operating safety for the unit. Never delay repairs and always have them carried out solely by qualified personnel; only original spare parts are to be used.

1.3 LIABILITY

The MANUFACTURER cannot be held liable for any personal accident or damage to property, which may arise from:
- failure to comply with the instructions provided in this manual regarding unit management, use and maintenance;
- violent actions or incorrect manoeuvres when performing maintenance on the unit;
- alterations made to the unit without prior written authorisation from the MANUFACTURER;
- incidents beyond the normal and correct use of the unit.

In any case, if the user attributes the incident to a defect in the unit, he must prove that the damage caused was a main and direct consequence of this "defect".

WARNING

- **When installing or servicing the unit, the rules stipulated in this manual must be complied with together with those on board the unit and in any case all necessary precautions must be taken.**
- **The fluids pressurised in the cooling circuit and the presence of electrical components may cause hazardous situations during installation and maintenance work.**
- **Therefore, only qualified personnel may perform work on the unit.**
- **THE UNIT MUST BE STARTED UP FOR THE FIRST TIME ONLY BY QUALIFIED PERSONNEL AUTHORISED BY THE COMPANY PLACING IT ON THE MARKET.**
- **FAILURE TO COMPLY WITH THE RULES STIPULATED IN THIS MANUAL AND ANY ALTERATION TO THE UNIT WITHOUT PRIOR AUTHORISATION WILL IMMEDIATELY MAKE THE WARRANTY NULL AND VOID.**
- **Before performing any work on the unit, ensure it has been disconnected from the power supply.**
- **Only original spare parts must be used for repairs or maintenance operations. THE MANUFACTURER declines all liability for damage deriving from non-compliance with the above-mentioned points.**
- **The unit is covered by the warranty according to the contractual agreements established at the time of sale.**
- **However, the warranty is rendered null and void if the regulations and user instructions stipulated in this manual are not complied with.**
- **In the event of a fault, do not try to repair it yourself or have an unauthorised technician perform the repairs. The warranty will otherwise be rendered null and void.**

1.4 INTENDED USE

The GSP/GSE/ENX/ENE units are water-water heat pumps that, with no combustion or flame, warm or cool the whole house and autonomously produce technical hot water for domestic purposes, thanks to the heat exchanged with the ground outside.
Their use is recommended within the functioning limits carried in this manual, or else the warranty attached to the sales contract would cease.

Any other use is to be considered inappropriate and the manufacturer declines all liability for any damage caused to persons, property or the unit that may derive from such use.

DANGER

- **Place the unit in environments where there is no risk of explosion, corrosion or fire.**
- **Improper use could cause serious repercussions on the unit.**
- **All routine and special maintenance operations must be performed with the unit off and the power supply disconnected.**
- **Wait about 30 minutes after switching off the unit before performing any maintenance in order to prevent burns.**
- **The described units must only be used indoors.**

WARNING - **Before performing any work on the unit, each operator must be perfectly aware of how the unit and its controls work and must have read and understood all the technical information in this manual.**

- **It is forbidden to use the unit in conditions or for purposes other than those stipulated in this manual and THE MANUFACTURER cannot be liable for faults, issues or accidents due to non-compliance with this prohibition.**
- **Do not repair the high pressure pipes by welding them.**
- **It is prohibited to tamper with, alter or modify, even partially, the systems or equipment referred to in the instructions manual, particularly the guards and symbols regarding personal safety.**
- **It is also prohibited to disregard the instructions or the required safety operations.**
- **Safety guidelines, together with general information provided in this manual, are particularly important.**

1.5 IDENTIFICATION OF THE UNIT

Each unit is distinguished by an identification label on the frame, which bears all the data required for installation, maintenance and unit traceability. Take note of the model, serial number, the definitive refrigerant charge and the reference drawings of the unit enclosed with this manual, in order to be easily retrieved in the event the data plate deteriorates and maintenance is required.

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Modello - Model	GSP022ML			
Matricola - Serial number	HFXXXXXXXXX			
Codice ID - Code ID				
Data di produzione - Date of production	22/08/17			
Categoria PED/ 2014/68/EU Category	II			
Procedura di valutazione conformità - Conformity module	D1			
Max pressione ammissibile PS - Max allowable pressure PS[bar-r]	41,5			
"Max pressione esercizio lato bassa pressione PS Max allowable pressure low pressure side PS [bar-r]"	41,5			
Max/Min temp. di stoccaggio - Max-Min storage temperature [°C]	+42 / -20			
Max/Min.temp.amb. di funzionamento-Max/Min amb.working temp.[°C]	+42 / -20			
Potenza frigorifera* - Cooling Capacity* [kW]	20,7			
EER*	3,83			
Potenza termica* - Heating Capacity* [kW]	27,3			
COP*	4,1			
Refrigerante - Refrigerant [Ashrae 15/1992] / GWP	R410A			
Carica refrigerante - Refrigerant charge [kg]	C1 (1*)	C2 -	C3 -	C4 -
Refrigerante aggiunto - Refrigerant added [kg]	C1 (2*)	C2 -	C3 -	C4 -
Carica totale - Total Charge [kg]	(2*)			
"Tonnellate di CO2 equivalenti Tonnes of CO2 equivalent"	60,55			
Taratura press. lato ALTA - HIGH pressure Switch Set [bar-r]	41,5			
Taratura press. lato BASSA - LOW pressure Switch Set [bar-r]	-			
"Taratura valvola sicurezza refrigerante Safety valve refrigerant Set [bar-r]"	-			
"Massima pressione esercizio circuito acqua Max working pressure water circuit [bar-r]"	5			
"Taratura valvola sicurezza acqua Safety valve water side Set [bar-r]"	-			
Alimentazione Elettrica- Power supply	400V/3ph 50Hz + N			
Potenza massima assorbita - Max. absorbed power [kW]	10,2			
Corrente massima - Full load ampere FLA [A]	27,7			
Corrente di spunto - Starting Current LRA [A]	/			
Schema elettrico - Wiring diagram	HF620Axxxx			
Schema frigorifero - Refrigeration diagram	HF630Axxxx			
Peso a vuoto - Empty weight [kg]	360			
"* EN14511-2 Contiene gas fluorurati ad effetto serra disciplinati dal protocollo di Kyoto Contains fluorinated greenhouse gases governed by the Kyoto protocol Ermeticamente sigillato/Hermetically sealed"				

1.6 GENERAL INSTRUCTIONS

WARNING

- **This manual must be stored carefully in a place that is known by the user of the unit, managers and operators in charge of transport, installation, use, maintenance, repairs and final dismantling.**
- **This manual indicates the intended use of the unit and provides instructions regarding transport, installation, assembly, adjustment and use. It provides information regarding maintenance, ordering spare parts, the presence of residual risks and personnel training.**
- **It is important to remember that the use and maintenance manual can never replace adequate user experience. This manual represents a reminder of the main operations to be performed by operators who have received specific training, for example by attending training courses held by the manufacturer, with reference to particular maintenance operations.**
- **This manual is to be considered an integral part of the unit and must be stored near the unit in a special container until the unit is eventually demolished. Request a new copy from the manufacturer if it is lost or deteriorated.**
- **Make sure all the users have thoroughly understood the operating instructions together with the meaning of any symbols on the unit.**
- **Potential accidents can be prevented by following these technical instructions with reference to Machinery Directive 2006/42/EC and subsequent amendments.**
- **In any case, always comply with the national safety regulations.**
- **Do not remove or damage the safety devices, labels and notices, especially those imposed by law.**
- **Adhesive labels intended for safer use are applied to the unit, therefore, it is very important to replace them if they become illegible.**
- **This manual reflects the applicable technology at the time the unit is sold and cannot be considered inadequate due to subsequent updates based on new experience.**
- **The MANUFACTURER has the right to update the production and manuals, without being obliged to update previous production and manuals, except for exceptional cases.**
- **Please call on the telephone numbers found in this manual for any requests for updates of the use and maintenance manual or supplements, which are to be considered an integral part of the manual.**
- **Contact THE MANUFACTURER for further information and to submit any proposals on how to improve the manual.**
- **THE MANUFACTURER kindly asks you to report the address of the new owner in case of transfer of the unit, in order to facilitate forwarding any supplements of the manual to the new user.**

2 - SAFETY REQUIREMENTS

2.1 GENERAL SAFETY RULES

2.1.1 Thoroughly know the unit

The unit must only be used by qualified personnel, who is obliged to be aware of the lay-out and function of all the controls, instruments, indicators, warning lights and various plates.

2.1.2 Wear protective clothing

Every operator must use personal protective equipment such as gloves, safety goggles and safety shoes.

2.1.3 Use safety equipment

Place a first aid kit and a fire extinguisher near the unit.
The extinguisher must always be fully loaded. Use it according to the Standards in force.

2.1.4 Maintenance and inspection warning signs

Apply a "WORKS IN PROGRESS" sign on all sides of the unit.
Carefully check the unit according to the list of operations specified in this manual.

2.2 GENERAL PRECAUTIONS

The Machinery Directive 2006/42/EC provides the following definitions (attachment 1,1.1.1):

DANGER ZONE: any zone within and/or around machinery in which a person is subject to a risk to his health or safety.

EXPOSED PERSON: any person wholly or partially in a danger zone.

OPERATOR: the person or persons installing, operating, adjusting, maintaining, cleaning, repairing or moving machinery.

WARNING **- It is mandatory to read and comply with the instructions provided in this use and maintenance manual before performing any operation or maintenance on the unit.**
It is too late to do so while working: Persons may be seriously injured and property seriously damaged if operations are performed incorrectly or the unit is not used as intended.

- **The employer must provide all the operators with the details regarding the risk of accidents, especially those deriving from noise, the personal protective equipment provided and the general accident prevention regulations implemented by international laws or regulations or those applicable in the country of use.**
  All the operators must comply with international accident prevention regulations and those applicable in the country of use in order to prevent potential accidents.
  Please note that the European Union has issued certain Directives regarding health and safety of workers, among which: Directive 89/391/EEC, 89/686/EEC, 89/654/EEC, 89/655/EEC, 89/656/EEC, 86/188/EEC, 92/58/EEC and 92/57/EEC, which every employer is obliged to comply with and enforce.
- **Before performing any work on the unit, each operator must be perfectly aware of how the unit and its controls work and must have read and understood all the information in this manual.**

WARNING **It is forbidden to tamper with or replace parts of the unit not expressly authorised by the MANUFACTURER.**
Using accessories, consumables or spare parts other than those recommended by the MANUFACTURER and/or stipulated in this manual can constitute a risk for the operators and/or damage the unit.
Any alteration to the unit that is not specifically authorised by the MANUFACTURER relieves the manufacturing company from any civil or criminal liability.

WARNING **- It is strictly prohibited to remove or tamper with any safety device.**
- All routine and special maintenance operations together with any installation must be performed with the unit off and the power supply disconnected.

- **Once the unit is cleaned, the operator must make sure there are no worn or damaged parts or other parts that are not firmly attached; otherwise, a maintenance technician must be asked to intervene.**
  Particular attention must be paid to the integrity of the pressurised pipes or other components subject to wear. Also make sure there are no leaking fluids or hazardous substances.
  Should there be any leak, the operator is prohibited from restarting the unit before having resolved the problem.
  If such problems arise, the operator must affix a sign on the unit before abandoning it, thereby indicating that maintenance is in progress and it is prohibited from starting it up.
- **It is prohibited to use flammable fluids to clean the unit.**
- **Periodically check the state of the labels and if necessary, replace them.**
- **The operator's workplace must be kept clean, tidy and free from objects that could hinder movements.**
- **The operators must not perform awkward operations, in uncomfortable positions, that could compromise their balance.**

The operators must pay attention to risks pertaining to clothing and/or being caught or entangled in moving parts.
It is recommended to use a cap to put up long hair.

- **Chains, bracelets and rings can also pose a hazard.**
- **The workplace must be adequately lit up for the intended operations. Insufficient or excessive lighting can pose risks.**
- **The instructions, accident prevention regulations and warnings provided in this manual must always be complied with.**

2.2.1 Safety warnings

The units have been designed and built according to the current state-of-the-art and technical rules in force regarding residential water-water heat pumps that exchange heat with the external ground. Applicable laws, provisions, regulations, decrees and directives to such machinery have been complied with.
The materials used and the parts of equipment, as well as production procedures, quality and control assurance comply with the highest standards of safety and reliability.
Unit performance, continuous operation and durability are maintained by using the above-mentioned materials and parts for the purposes specified in this user manual, handling them with due care and performing thorough maintenance and up-to-standard service.

2.2.2 Accident prevention safety

The MANUFACTURER cannot be held liable for accidents caused when using the unit, due to the user not complying with laws, provisions, regulations and standards in force regarding fluid chillers and heat pumps.

2.2.3 Operational safety

THE MANUFACTURER cannot be held liable in case of malfunctions and damage if the unit:
- is used for purposes other than those intended;
- is not handled and maintained according to the operating rules specified in this manual;
- is not serviced regularly and continuously as prescribed or non-original spare parts are used;
- is either modified or a component is replaced without written authorisation from the MANUFACTURER, especially when the efficiency of the safety systems is intentionally reduced or eliminated;
- is used beyond the ambient temperature limits allowed.

2.3 PRECAUTIONS FOR MAINTENANCE

2.3.1 Tools

Personal injury is prevented by not using worn or damaged, low quality or makeshift tools.

WARNING **The manufacturer cannot be held liable for damage caused if modified tools are used.**

2.3.2 Personnel

Routine maintenance specified in this manual must only be performed by authorised and trained personnel.
Contact the MANUFACTURER for maintenance or repairs not specified in this manual.

2.3.3 Keeping the unit clean

Stains of oil and grease and scattered tools or broken parts are hazardous as persons can slip or fall. Always keep the unit area clean and tidy.
Do not use diesel or petroleum to clean the unit as they leave an oily layer that increases dust adhesion, and neither solvents must be used (even if weak) as they damage the paint and increase the formation of rust.
If a jet of water penetrates the electrical equipment the contacts oxidise and the unit may malfunction.
Therefore, do not use jets of water or steam on the sensors, connectors or any electrical part.

2.3.4 Care and maintenance

Many accidents and damage are due to maintenance errors, such as:
- lack of water in the circuit;
- incorrect percentage of refrigerant in the circuit;
- inadequate refrigerant;
- failure to keep the unit area clean;
- circuit inefficiency (pipe connections, loose pipes, screws, etc.).

Maintenance must be performed carefully even for personal safety.
Never delay repairs.
Only specialised or authorised personnel must perform repairs.
Always comply with the following safety standards, even when you are completely familiar with all the operating elements:
- Always keep the unit and its surrounding area clean.
- Before starting work check that the safety devices are in perfect working condition.
- Make sure that no unqualified or unauthorised persons enter the unit area.

3 - DESCRIPTION OF THE PRODUCT AND TECHNICAL DATA

3.1 THE SERIES

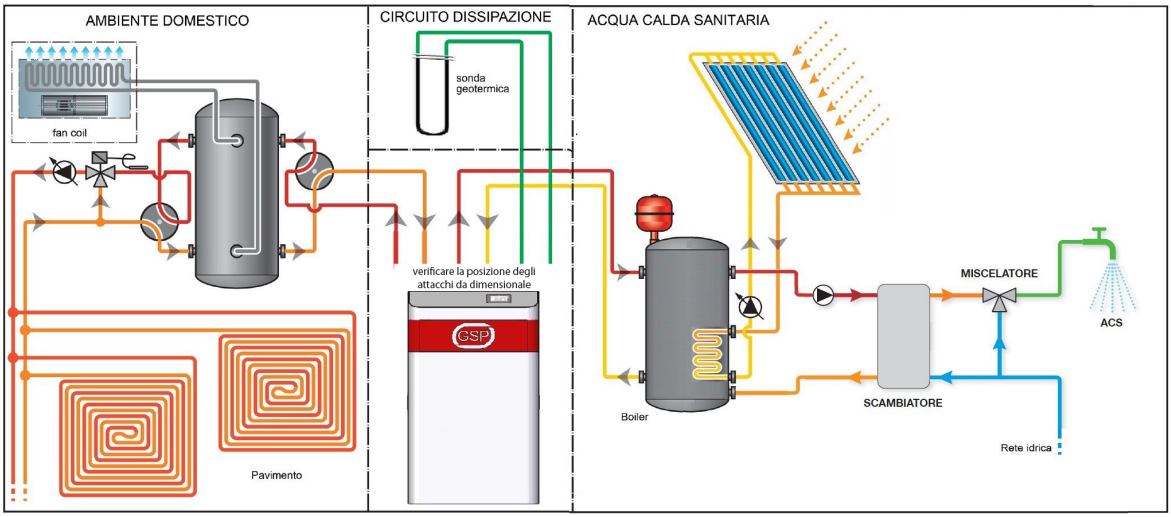
The units described in this manual are multi-purpose heat pumps for the production of domestic hot water, heating, cooling and dehumidification of the living spaces.
During autumn and winter operation, they heat the room or produce domestic hot water. The inertia of the system, increased by the storage tank, which we recommend combining with the unit even on the heating system, also enables the priority production of domestic hot water without discomfort.

In summer mode, they cool water for air-conditioning purposes and, if necessary dehumidify environments, and produce hot water or assign alternated priority to cooling (ENX/ENE) or total recovery (GSP/GSE).

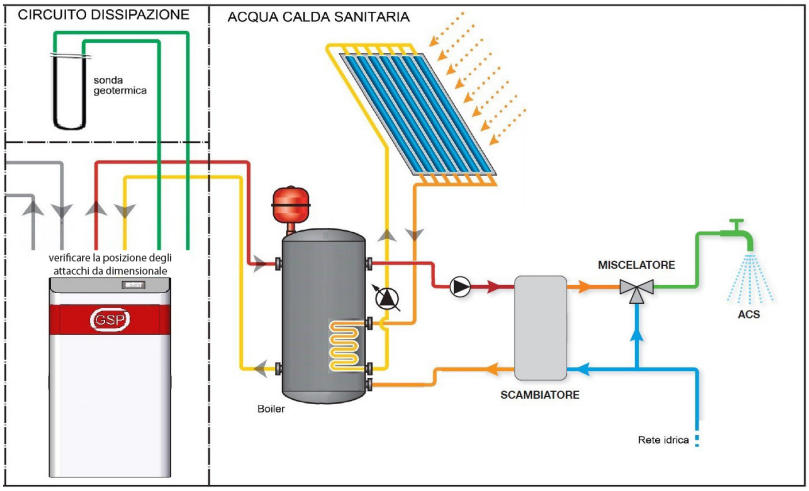
GSP/GSE TOTAL HEAT RECOVERY UNITS CONSIST OF TWO DIFFERENT VERSIONS: FOR 2 PIPES SYSTEMS (M VERSION) AND FOR 4 PIPES SYSTEMS (P VERSION).

2 PIPES VERSION: these units have one reversible hot/cold hydraulic side and another one dedicated to the domestic hot water production.

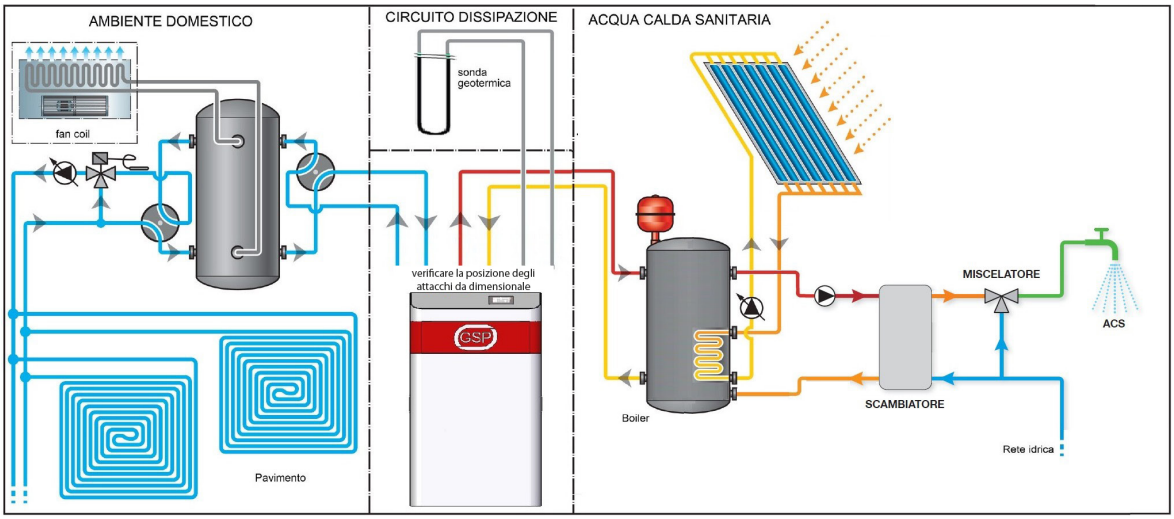
Priority production of domestic hot water, alternated with environmental heating.



Production of domestic hot water only.



Cooling and simultaneous production of domestic hot water.
During summer season GSP/GSE cools and dehumidifies and simultaneously produces domestic hot water, practically for free. Cooling production is not interrupted during domestic hot water production, obtaining better comfort even with heavy loads in the environments.

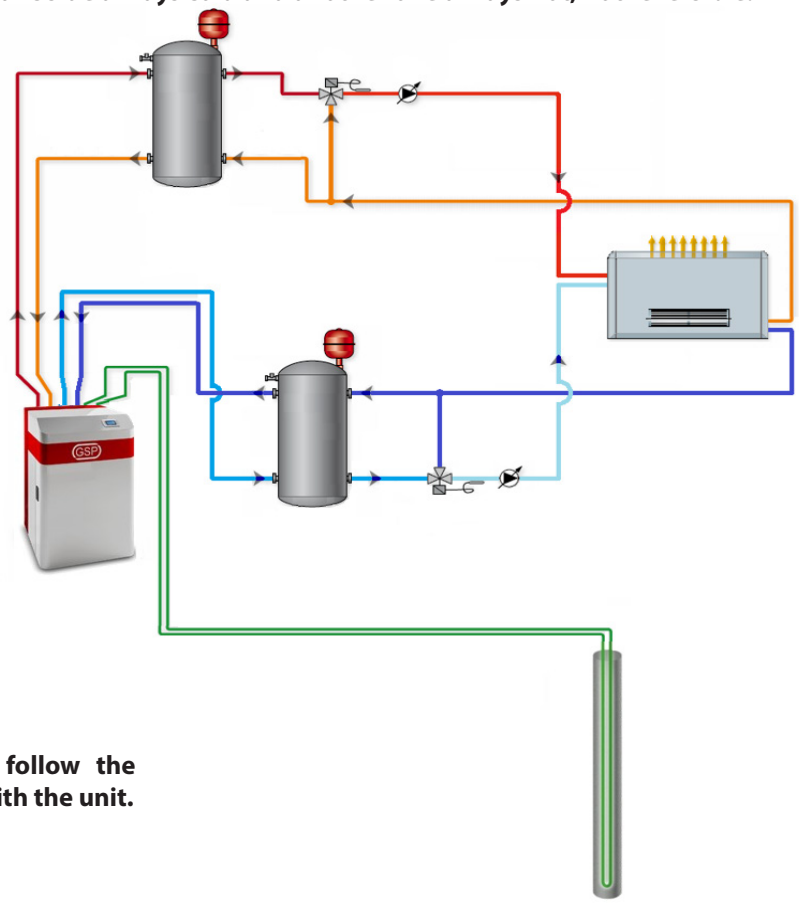


WARNING **The system diagrams shown in this manual are generic and illustrative. For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.**

4 PIPES VERSION: these units have one hydraulic side always cold and another one always hot, not reversible.

GSP/GSE P version units interface 4 pipes sytems, with simultaneous heating and cooling requests.

They can provide only heating or only cooling capacity, or both cooling and heating capacities at the same time while in total recovery mode.



For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.

3.1.1 Identification of the unit

Here are the features shared by the units of the series:

- Expansion device: EEV (electronic expansion valve) to benefit from the possibility of generating thermodynamic cycles with reduced pressure changes and therefore significant COP advantages.
- Integrated controller of the pump on the system circuit and DHW circuit: the pump is managed directly by the unit.
- Dissipation circuit pump with variable speed combined with an inverter.
- AISI 316 Stainless steel high-efficiency plate heat exchangers.
- Advanced electronic control to adequately address the needs of capacity control of loads for optimal operation of partial loads, increasingly the subject of evaluation and discerning technical choices by heat engineering designers.

Double water circuit:

- Air conditioning circuit with reversible cooling circuit side and variable set-point between min/max with potential-free contact or with 0-10V or 4-20mA signal.
- for ENX/ENE: DWH circuit managed with a 3-way valve installed inside the unit
- for GSE/GSP: Separate DWH circuit, which means that DHW can be produced under total heat recovery conditions in summer mode.

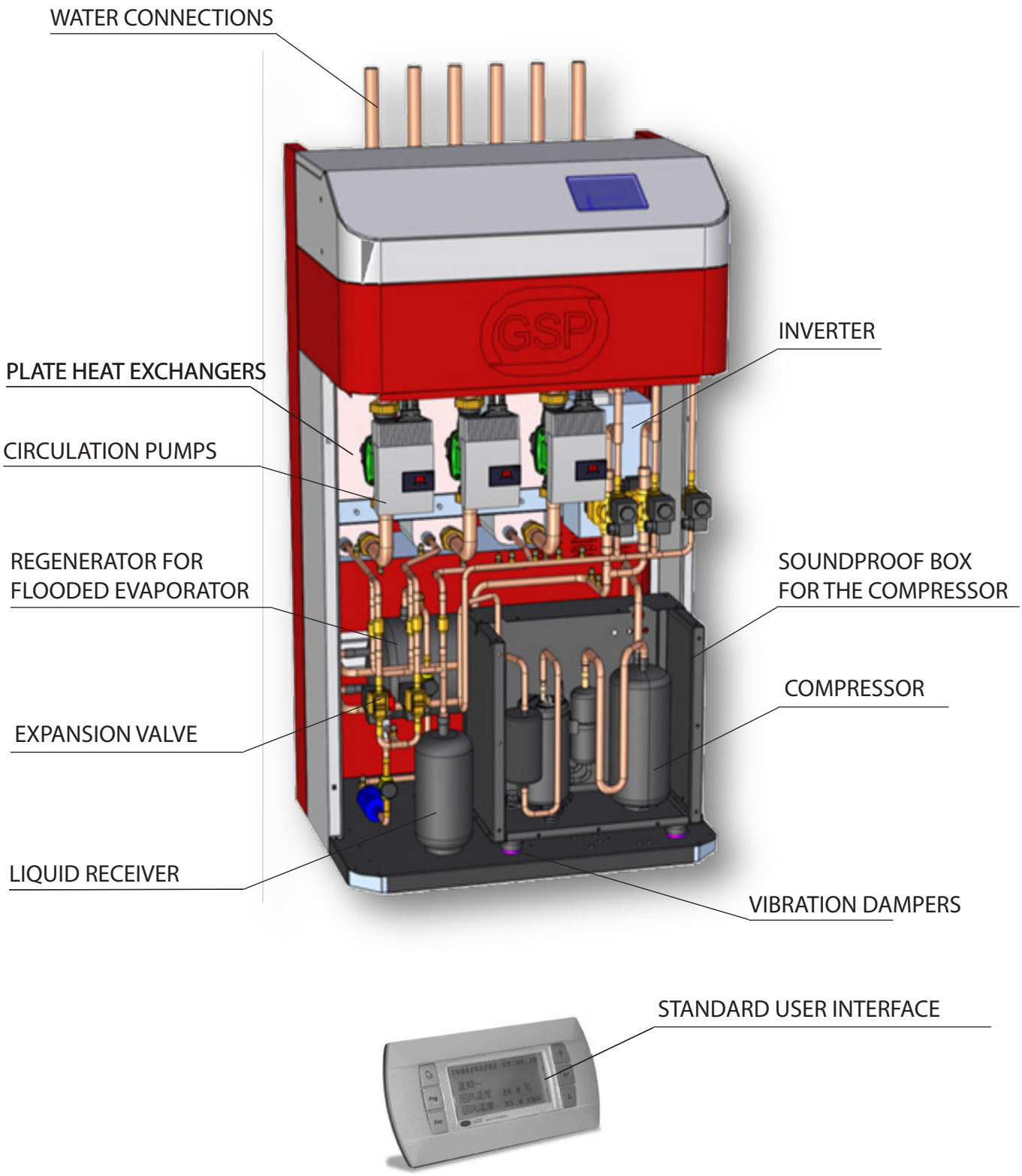
The basic selection in the development of the series consists in using the following:

- Scroll compressors or twin-rotary on/off units (GSE/ENE) or BLDC inverters (GSP/ENX)
- Flooded evaporator (GSP).

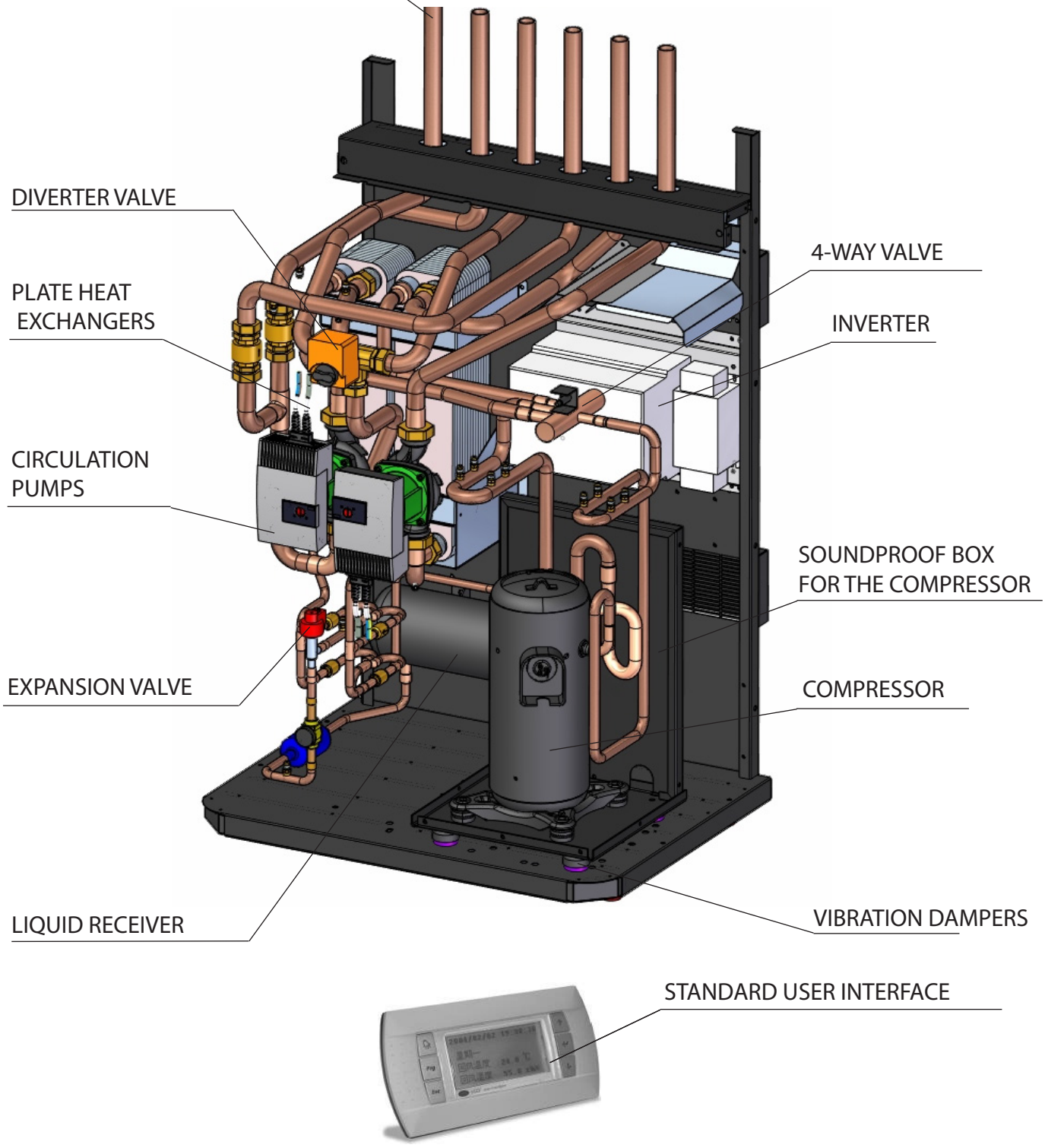
The structure of the internal unit features the following characteristics: side panelling in galvanised sheet metal painted with polyester epoxy powders and polymerised in the oven at 180°C and a front cover with a built-in display. The unit is fully panelled, but can be accessed on 3 sides since the panels can easily be removed, thus simplifying maintenance and/or inspections. All routine maintenance is performed from the front of the unit.

3.1.2 Main components of the indoor unit

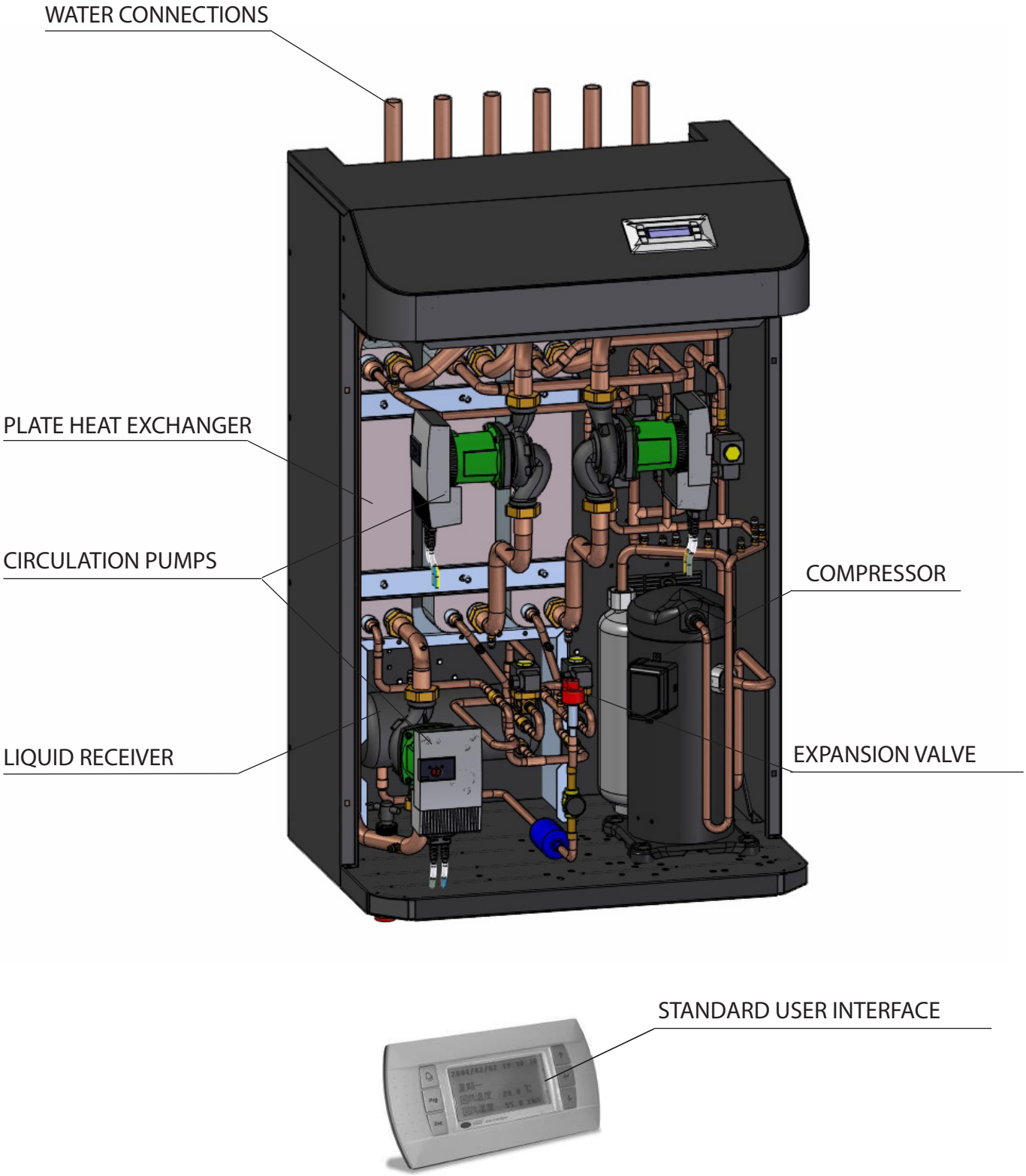
GSP UNIT



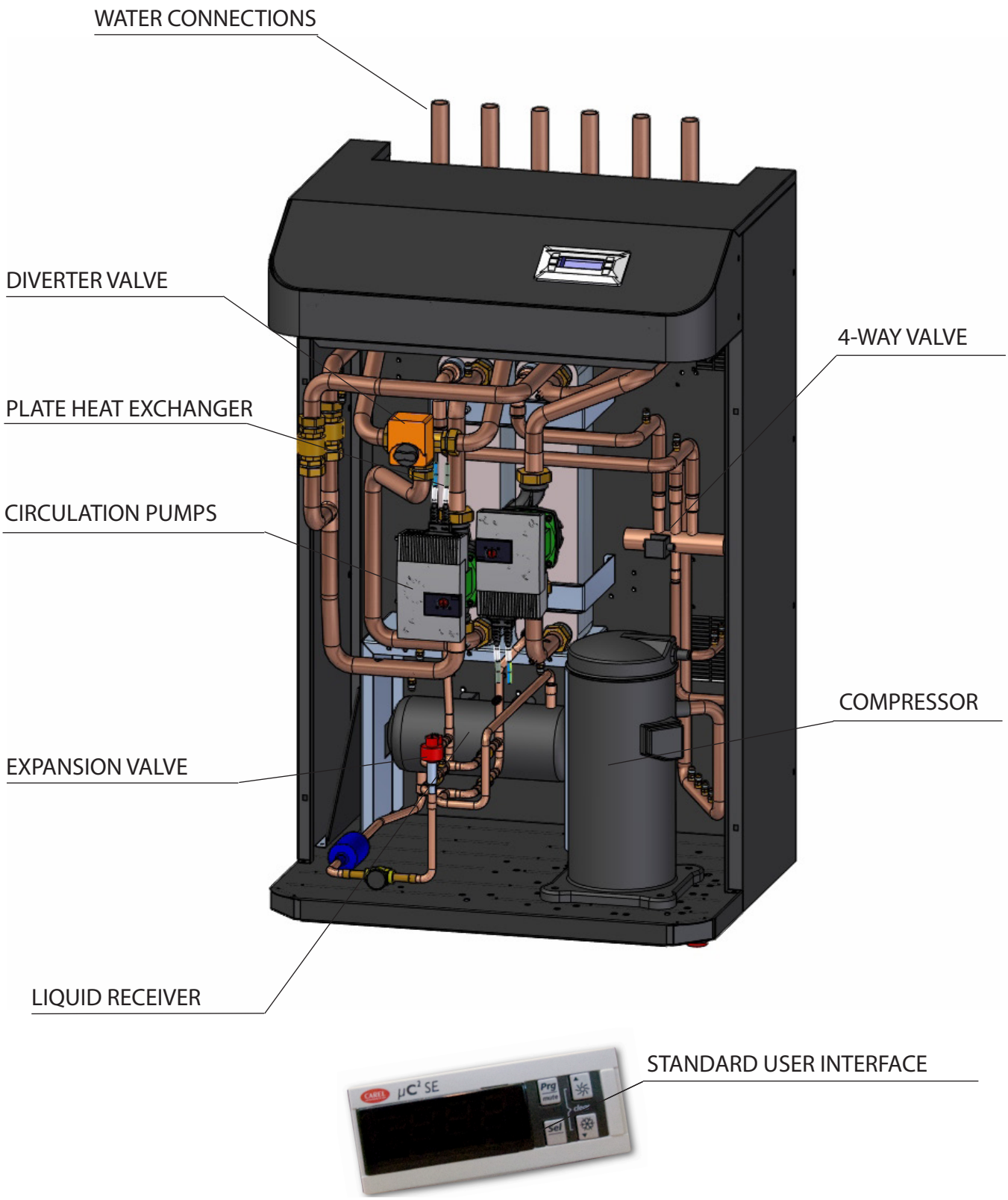
ENX UNIT


WATER CONNECTIONS
DIVERTER VALVE
PLATE HEAT EXCHANGERS
CIRCULATION PUMPS
EXPANSION VALVE
LIQUID RECEIVER
4-WAY VALVE
INVERTER
SOUNDPROOF BOX FOR THE COMPRESSOR
COMPRESSOR
VIBRATION DAMPERS
STANDARD USER INTERFACE

GSE UNIT


WATER CONNECTIONS
PLATE HEAT EXCHANGER
CIRCULATION PUMPS
LIQUID RECEIVER
COMPRESSOR
EXPANSION VALVE
STANDARD USER INTERFACE

ENE UNIT


WATER CONNECTIONS
DIVERTER VALVE
4-WAY VALVE
PLATE HEAT EXCHANGER
CIRCULATION PUMPS
COMPRESSOR
EXPANSION VALVE
LIQUID RECEIVER
STANDARD USER INTERFACE

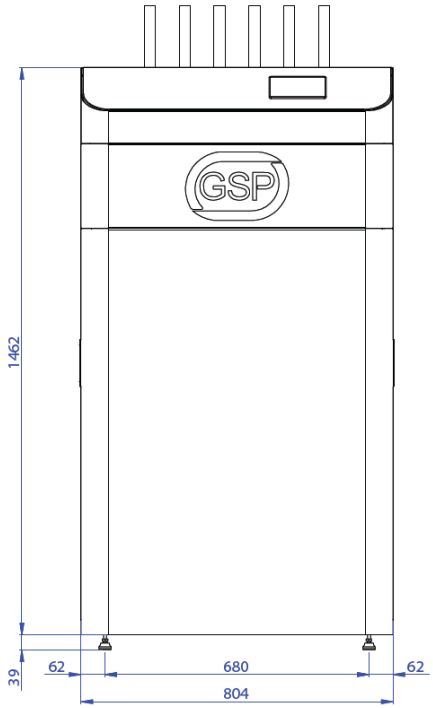
3.1.3 Technical data

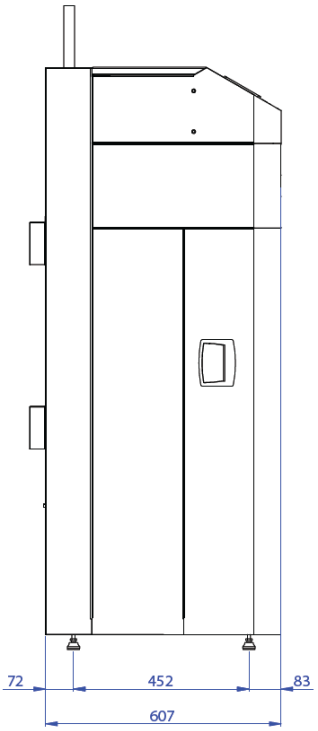
TECHNICAL DATA		GSP 012		GSP 022		GSP 033		GSP 044	
Compressor status	**[Hz]**	**30**	**110**	**30**	**85**	**30**	**120**	**30**	**120**
		MIN	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**
HEATING B5/W35, NO GLYCOL									
Heating Capacity	[kW]	3.18	13.01	10.12	28.55	10.22	40.08	13.14	49.15
Thermal Output UNI EN 14511	[kW]	3.17	12.9	10.1	28.4	10.2	40.0	13.1	49.0
Compressor Absorbed Power	[kW]	0.57	2.57	1.92	5.76	1.89	8.63	2.26	10.99
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.54	2.43	1.82	5.60	1.82	8.47	2.30	10.8
Compressor Absorbed Current	[A]	2.75	12.44	3.08	9.24	3.03	13.84	3.63	17.62
COP	[-]	5.59	5.05	5.28	4.95	5.4	4.65	5.8	4.47
COP UNI EN 14511	[-]	5.87	5.32	5.54	5.08	5.59	4.72	5.70	4.54
UTILITY Water Flow Rate	[kg/h]	551	2253	1753	4946	1770	6943	2275	8513
SOURCE Water Flow Rate	[kg/h]	765	3065	2407	6701	2441	9272	3180	11267
COOLING B30/W7									
Cooling Capacity	[kW]	3.2	12.8	9.97	27.54	10.09	38.03	13.26	46.51
Cooling Capacity UNI EN 14511	[kW]	3.21	12.9	10.00	27.6	10.1	38.2	13.3	46.6
Compressor Absorbed Power	[kW]	0.56	2.55	1.9	5.74	1.87	8.58	2.24	10.97
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.53	2.41	1.82	5.54	1.82	8.36	2.31	10.8
Compressor Absorbed Current	[A]	2.69	12.33	3.05	9.21	2.99	13.76	3.59	17.59
EER	[-]	5.74	5.02	5.25	4.79	5.41	4.43	5.92	4.24
EER UNI EN 14511	[-]	6.03	5.33	5.49	4.99	5.56	4.57	5.77	4.33
UTILITY Water Flow Rate	[kg/h]	549	2199	1712	4730	1733	6531	2277	7986
SOURCE Water Flow Rate	[kg/h]	639	2606	2016	5645	2032	7894	2638	9726
COOLING + DHW W7/W55									
Cooling Capacity	[kW]	2.44	9.85	7.89	21.87	7.96	30.06	9.97	35.04
Cooling Capacity UNI EN 14511	[kW]	2.45	9.91	7.91	22.0	7.96	30.2	9.98	35.2
DHW Heating capacity	[kW]	3.23	13.37	10.43	29.47	10.48	41.53	13.02	49.82
Thermal Output UNI EN 14511	[kW]	3.21	13.3	10.4	29.4	10.5	41.4	13.0	49.7
Compressor Absorbed Power	[kW]	0.89	3.99	2.88	8.64	2.87	13.04	3.47	16.8
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.88	3.87	2.83	8.44	2.84	12.8	3.42	16.6
Compressor Absorbed Current	[A]	4.32	19.29	4.63	13.85	4.6	20.91	5.57	26.95
Total COP	[-]	6.34	5.81	6.35	5.94	6.43	5.49	6.62	5.05
Total COP UNI EN 14511	[-]	6.47	5.99	6.45	6.09	6.47	5.59	6.72	5.12
UTILITY Water Flow Rate	[kg/h]	419	1692	1356	3756	1366	5162	1711	6017
DHW Flow Rate	[kg/h]	563	2332	1819	5141	1828	7244	2272	8690
HEATING B0/W35, 25% glycol									
Heating Capacity	[kW]	2.71	11.09	8.6	24.26	8.69	34.13	11.06	41.6
Thermal Output UNI EN 14511	[kW]	2.70	11.0	8.58	24.2	8.69	34.0	11.0	41.5
Compressor Absorbed Power	[kW]	0.57	2.56	1.93	5.77	1.91	8.66	2.26	10.88
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.55	2.43	1.86	5.59	1.87	8.45	2.34	10.7
Compressor Absorbed Current	[A]	2.77	12.36	3.1	9.26	3.07	13.88	3.62	17.45
COP	[-]	4.73	4.34	4.45	4.2	4.55	3.94	4.9	3.82
COP UNI EN 14511	[-]	4.92	4.55	4.60	4.32	4.65	4.02	4.72	3.89
UTILITY Water Flow Rate	[kg/h]	469	1922	1490	4202	1506	5911	1915	7206
SOURCE Water Flow Rate	[kg/h]	690	2765	2158	5997	2192	8289	2835	10015

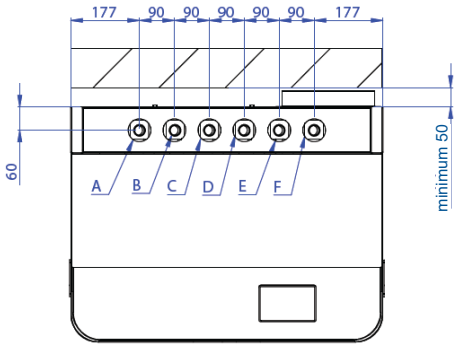
TECHNICAL DATA		GSP 012		GSP 022		GSP 033		GSP 044	
Compressor status	**[Hz]**	**30**	**110**	**30**	**85**	**30**	**120**	**30**	**120**
		MIN	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**
HEATING B10/W35									
Heating Capacity	[kW]	3.5	14.32	11.04	31.01	11.14	43.46	14.4	53.45
Thermal Output UNI EN 14511	[kW]	3.48	14.3	11.0	30.9	11.1	43.3	14.4	53.4
Compressor Absorbed Power	[kW]	0.56	2.56	1.91	5.75	1.88	8.6	2.25	10.99
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.54	2.43	1.84	5.55	1.84	8.37	2.34	10.8
Compressor Absorbed Current	[A]	2.72	12.39	3.06	9.23	3.01	13.8	3.61	17.62
COP	[-]	6.2	5.59	5.79	5.39	5.94	5.05	6.39	4.86
COP UNI EN 14511	[-]	6.44	5.86	5.97	5.57	6.05	5.18	6.13	4.92
UTILITY Water Flow Rate	[kg/h]	605	2481	1911	5371	1930	7527	2495	9258
SOURCE Water Flow Rate	[kg/h]	515	2070	1606	4453	1628	6158	2131	7512
DHW B10/W55									
DHW Heating capacity	[kW]	3.08	12.82	9.98	28.25	10.02	39.92	12.43	47.92
Thermal Output UNI EN 14511	[kW]	3.07	12.8	9.95	28.1	10.0	39.8	12.4	47.8
Compressor Absorbed Power	[kW]	0.89	3.96	2.88	8.61	2.86	13.0	3.46	16.72
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.87	3.84	2.84	8.41	2.85	12.8	3.60	16.6
Compressor Absorbed Current	[A]	4.29	19.13	4.61	13.8	4.59	20.84	5.55	26.82
COP	[-]	3.47	3.24	3.47	3.28	3.5	3.07	3.59	2.87
COP UNI EN 14511	[-]	3.52	3.32	3.51	3.35	3.51	3.12	3.44	2.88
DHW Flow Rate	[kg/h]	537	2236	1741	4928	1748	6964	2168	8359
SOURCE Water Flow Rate	[kg/h]	394	1602	1279	3548	1287	4888	1609	5699
Maximum electric absorption									
Electrical power supply		single-phase 230/1/50		three-phase 400/3+N/50		three-phase 400/3+N/50		three-phase 400/3+N/50	
Tot FLA	[A]	21		22		31		50	
Noise emission									
Lw indoor unit noise power level	[dBA]	54		55		57		58	
Compressor									
Type of compressor		Twin Rotary		Scroll		Scroll		Scroll	
Electric motor technology		BLDC		BLDC		BLDC		BLDC	
N° compressors/cooling circuits		1/1		1/1		1/1		1/1	
Dimensional drawing/Frame		F1		F2		F2		F2	

WARNING **The data for the power supply values are meant as a guide. In any case refer to the unit's wiring diagram.**

FRAME 1 OVERALL DRAWINGS: GSP 012

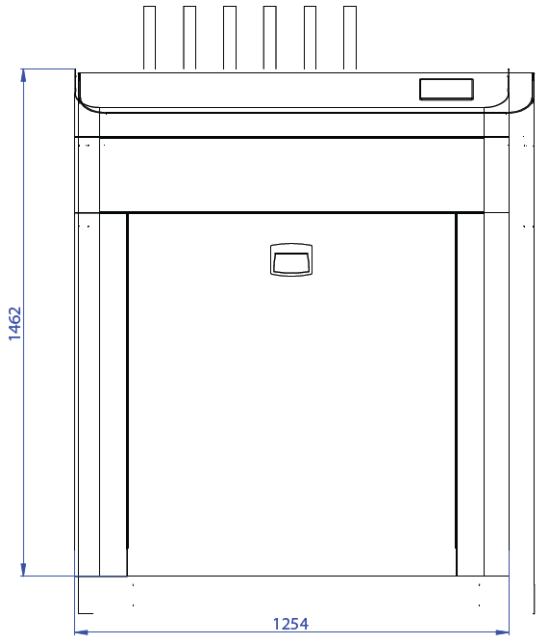


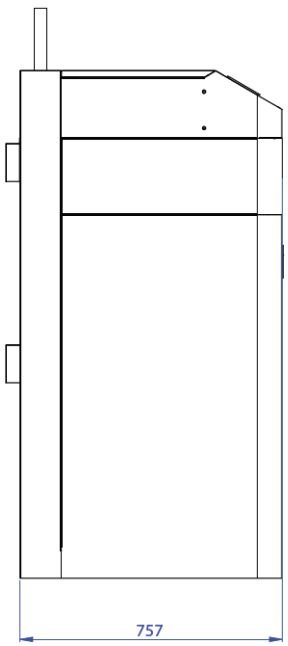


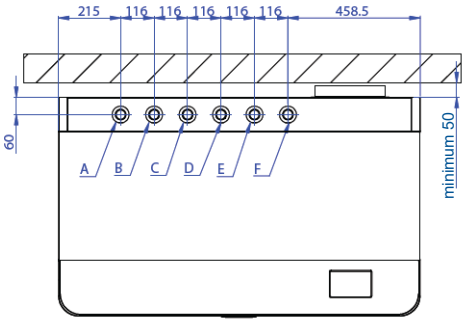


CONNESSIONI IDRAULICHE - HIDRAULIC CONNECTIONS			
Rif.	Attacchi - Connections	TIPO - TYPE	
A	OUT UTENZA - USER WATER OUTLET	Tubo Rame	Ø28
B	IN UTENZA - USER WATER INLET	Tubo Rame	Ø28
C	OUT DISSIPAZIONE - DISSIPATOR WATER OUTLET	Tubo Rame	Ø28
D	IN DISSIPAZIONE - DISSIPATOR WATER INLET	Tubo Rame	Ø28
E	OUT A.C.S - HEAT RECOVERY WATER OUTLET	Tubo Rame	Ø28
F	IN A.C.S - HEAT RECOVERY WATER INLET	Tubo Rame	Ø28

FRAME 2 OVERALL DRAWINGS: GSP 022-033-044







CONNESSIONI IDRAULICHE - HIDRAULIC CONNECTIONS			
Rif.	Attacchi - Connections	TIPO - TYPE	
A	OUT UTENZA - USER WATER OUTLET	Tubo Rame	Ø35
B	IN UTENZA - USER WATER INLET	Tubo Rame	Ø35
C	OUT DISSIPAZIONE - DISSIPATOR WATER OUTLET	Tubo Rame	Ø35
D	IN DISSIPAZIONE - DISSIPATOR WATER INLET	Tubo Rame	Ø35
E	OUT A.C.S - HEAT RECOVERY WATER OUTLET	Tubo Rame	Ø35
F	IN A.C.S - HEAT RECOVERY WATER INLET	Tubo Rame	Ø35

WARNING **Dimensional drawings are meant as a guide. Please check the dimensional drawing enclosed with the unit for an accurate reference.**

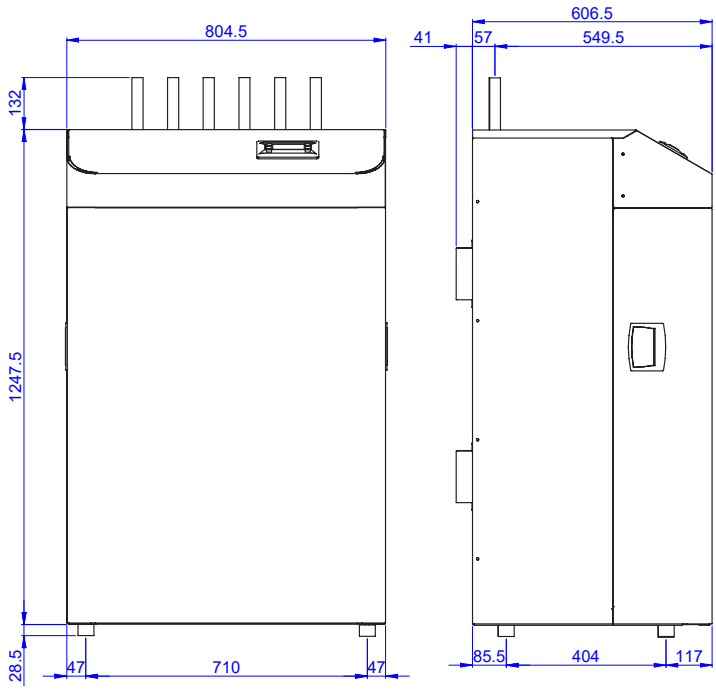
WARNING **The manufacturer reserves the right to make improvements to the unit due to its development.**

TECHNICAL DATA		ENX 012		ENX 022		ENX 033	
Compressor status	**[Hz]**	**30**	**110**	**30**	**75**	**30**	**85**
		MIN	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**
COOLING B30/W7							
Cooling Capacity	[kW]	3.03	10.94	9.17	20.78	11.8	28.62
Cooling Capacity UNI EN 14511	[kW]	3.04	11.0	9.19	20.8	11.8	28.7
Compressor Absorbed Power	[kW]	0.57	2.7	1.93	5.22	2.33	7.46
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.55	2.59	1.88	5.08	2.26	7.31
Compressor Absorbed Current	[A]	2.75	13.05	3.1	8.37	3.73	11.96
EER	[-]	5.33	4.05	4.75	3.98	5.07	3.84
EER UNI EN 14511	[-]	5.57	4.25	4.90	4.11	5.24	3.93
UTILITY Water Flow Rate	[kg/h]	521	1878	1575	3569	2027	4915
SOURCE Water Flow Rate	[kg/h]	612	2306	1883	4395	2399	6094
COOLING B30/W18							
Cooling Capacity	[kW]	4.17	15.4	12.9	29.17	16.8	40.34
Cooling Capacity UNI EN 14511	[kW]	4.18	15.5	13.0	29.2	16.8	40.3
Compressor Absorbed Power	[kW]	0.53	2.67	1.92	5.29	2.27	7.57
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.50	2.55	1.81	5.25	2.14	7.59
Compressor Absorbed Current	[A]	2.55	12.9	3.08	8.49	3.64	12.14
EER	[-]	7.88	5.77	6.74	5.51	7.39	5.33
EER UNI EN 14511	[-]	8.41	6.07	7.16	5.56	7.85	5.31
UTILITY Water Flow Rate	[kg/h]	580	2656	2230	5032	2893	6959
SOURCE Water Flow Rate	[kg/h]	802	3074	2531	5859	3250	8140
HEATING B0/W35, 25% glycol							
Heating Capacity	[kW]	2.69	10.85	8.8	21.55	10.97	29.48
Thermal Output UNI EN 14511	[kW]	2.68	10.8	8.78	21.5	11.0	29.4
Compressor Absorbed Power	[kW]	0.58	2.61	1.92	5.09	2.28	7.14
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.55	2.50	1.86	4.99	2.21	7.06
Compressor Absorbed Current	[A]	2.78	12.63	3.09	8.16	3.66	11.45
COP	[-]	4.68	4.15	4.57	4.24	4.81	4.13
COP UNI EN 14511	[-]	4.86	4.32	4.72	4.31	4.96	4.17
UTILITY Water Flow Rate	[kg/h]	466	1879	1523	3733	1901	5106
SOURCE Water Flow Rate	[kg/h]	683	2673	2221	5340	2803	7254
HEATING B10/W35							
Heating Capacity	[kW]	3.47	13.99	11.15	27.25	14.11	37.67
Thermal Output UNI EN 14511	[kW]	3.46	13.9	11.1	27.2	14.1	37.6
Compressor Absorbed Power	[kW]	0.57	2.65	1.92	5.13	2.3	7.31
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.55	2.54	1.86	5.02	2.23	7.19
Compressor Absorbed Current	[A]	2.74	12.82	3.07	8.23	3.69	11.72
COP	[-]	6.11	5.27	5.82	5.31	6.14	5.16
COP UNI EN 14511	[-]	6.33	5.48	5.99	5.42	6.31	5.24
UTILITY Water Flow Rate	[kg/h]	601	2423	1931	4720	2444	6525
SOURCE Water Flow Rate	[kg/h]	510	1999	1623	3901	2074	5361

TECHNICAL DATA		ENX 012		ENX 022		ENX 033	
Compressor status	**[Hz]**	**30**	**110**	**30**	**75**	**30**	**85**
		MIN	**MAX**	**MIN**	**MAX**	**MIN**	**MAX**
DHW B10/W55							
DHW Heating capacity	[kW]	3.07	12.58	10.12	24.92	12.25	33.24
Thermal Output UNI EN 14511	[kW]	3.06	12.5	10.1	24.9	12.2	33.2
Compressor Absorbed Power	[kW]	0.89	4.04	2.88	7.61	3.5	10.96
Absorbed Power UNI EN 14511 with pumps on board	[kW]	0.87	3.94	2.84	7.49	3.46	10.8
Compressor Absorbed Current	[A]	4.3	19.54	4.61	12.21	5.62	17.58
COP	[-]	3.44	3.11	3.52	3.27	3.5	3.03
COP UNI EN 14511	[-]	3.49	3.18	3.55	3.32	3.53	3.07
DHW Flow Rate	[kg/h]	535	2195	1765	4348	2136	5799
SOURCE Water Flow Rate	[kg/h]	392	1549	1302	3127	1573	4050
Maximum electric absorption							
Electrical power supply		single-phase 230/1/50		three-phase 400/3+N/50		three-phase 400/3+N/50	
Tot FLA	[A]	21		18		30	
Noise emission							
Lw indoor unit noise power level	[dBA]	54		55		57	
Lp sound pressure (10m Q=2) indoor unit	[dBA]	26		27		29	
Compressor							
Type of compressor		Twin Rotary		Scroll		Scroll	
Electric motor technology		BLDC		BLDC		BLDC	
N° compressors/cooling circuits		1/1		1/1		1/1	
Dimensional drawing/Frame		F1		F1		F2	

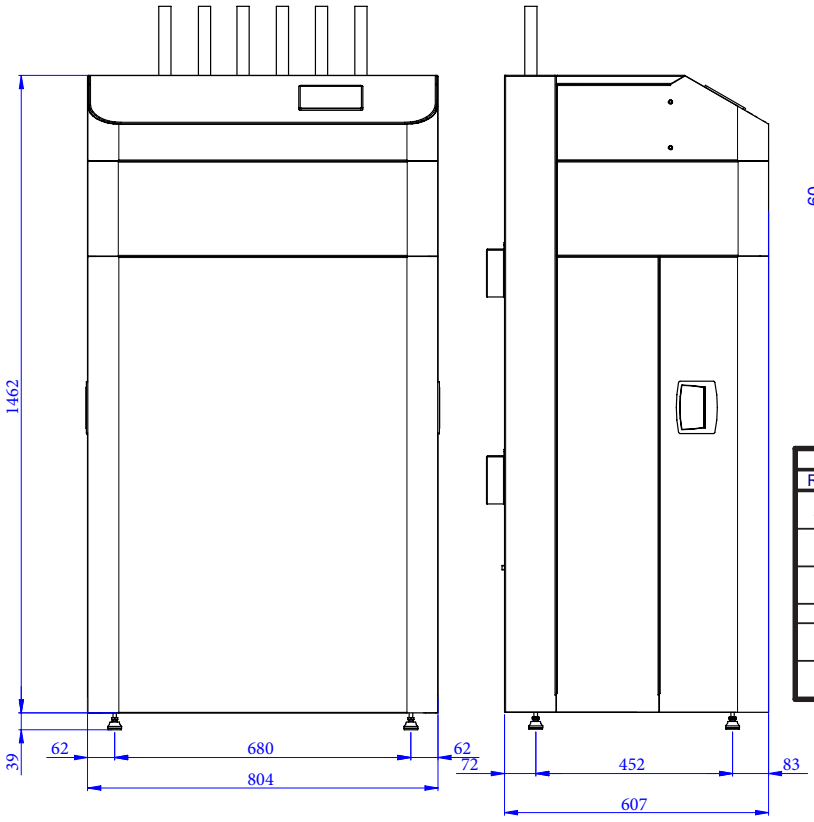
WARNING **The data for the power supply values are meant as a guide. In any case refer to the unit's wiring diagram.**

FRAME 1 OVERALL DRAWINGS



CONNESSIONI IDRAULICHE - HIDRAULIC CONNECTIONS			
Rif.	Attacchi - Connections	TIPO - TYPE	
A	OUT DISSIPAZIONE - DISSIPATOR WATER OUTLET	Tubo Rame	Ø28
B	IN DISSIPAZIONE - DISSIPATOR WATER INLET	Tubo Rame	Ø28
C	OUT UTENZA - USER WATER OUTLET	Tubo Rame	Ø28
D	IN UTENZA - USER WATER INLET	Tubo Rame	Ø28
E	OUT A.C.S - HEAT RECOVERY WATER OUTLET	Tubo Rame	Ø28
F	IN A.C.S - HEAT RECOVERY WATER INLET	Tubo Rame	Ø28

FRAME 2 OVERALL DRAWINGS



CONNESSIONI IDRAULICHE - HIDRAULIC CONNECTIONS			
Rif.	Attacchi - Connections	TIPO - TYPE	
A	OUT DISSIPAZIONE - DISSIPATOR WATER OUTLET	Tubo Rame	Ø35
B	IN DISSIPAZIONE - DISSIPATOR WATER INLET	Tubo Rame	Ø35
C	OUT UTENZA - USER WATER OUTLET	Tubo Rame	Ø35
D	IN UTENZA - USER WATER INLET	Tubo Rame	Ø35
E	OUT A.C.S - HEAT RECOVERY WATER OUTLET (optional)	Tubo Rame	Ø35
F	IN A.C.S - HEAT RECOVERY WATER INLET (optional)	Tubo Rame	Ø35

WARNING **Dimensional drawings are meant as a guide. Please check the dimensional drawing enclosed with the unit for an accurate reference.**

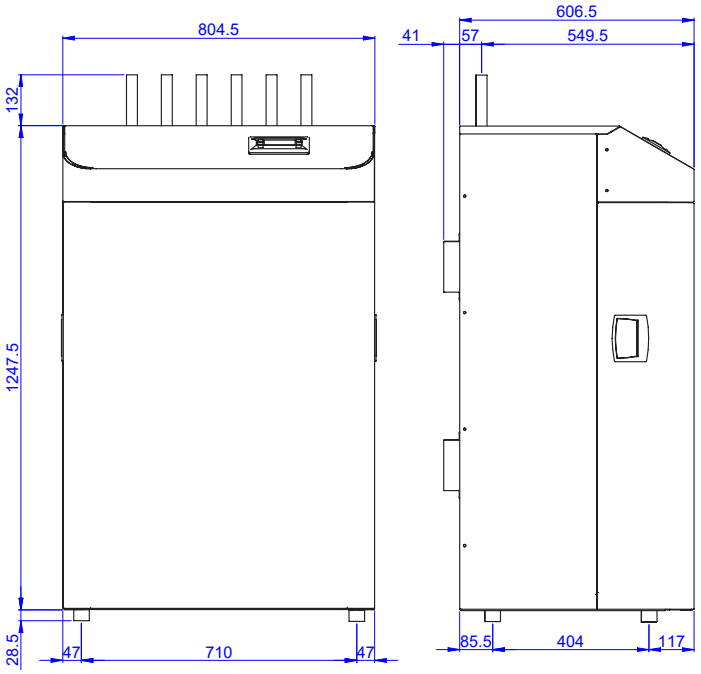
WARNING **The manufacturer reserves the right to make improvements to the unit due to its development.**

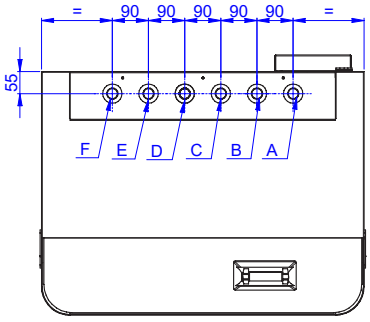
TECHNICAL DATA		GSE006	GSE009	GSE012	GSE017	GSE022	GSE025	GSE030	GSE033	GSE040
COOLING B30/W7										
Cooling Capacity	[kW]	7.06	8.86	12.7	17.05	20.93	24.01	28.12	31.85	35.92
Cooling Capacity UNI EN 14511	[kW]	7.11	8.92	12.7	17.1	21.0	24.1	28.2	31.9	36.0
Compressor Absorbed Power	[kW]	1.61	2.03	2.89	4.06	4.94	5.55	6.48	7.27	8.4
Absorbed Power UNI EN 14511 with pumps on board	[kW]	1.50	1.91	2.77	3.93	4.80	5.38	6.32	7.10	8.31
Compressor Absorbed Current	[A]	7.78	9.78	13.96	6.51	7.93	8.9	10.39	11.66	13.47
EER	[-]	4.39	4.38	4.39	4.2	4.24	4.33	4.34	4.38	4.28
EER UNI EN 14511	[-]	4.74	4.67	4.61	4.36	4.37	4.47	4.46	4.50	4.33
UTILITY Water Flow Rate	[kg/h]	1213	1522	2180	2929	3595	4123	4830	5470	6168
SOURCE Water Flow Rate	[kg/h]	1488	1869	2675	3622	4439	5071	5937	6713	7603
COOLING + DHW W7/W55										
Cooling Capacity	[kW]	5.28	6.76	9.73	13.39	16.32	18.71	21.51	24.62	28.1
Cooling Capacity UNI EN 14511	[kW]	5.32	6.80	9.77	13.5	16.4	18.8	21.6	24.7	28.2
DHW Heating capacity	[kW]	7.79	9.83	14.11	19.16	23.25	26.78	31.03	35.03	39.86
Thermal Output UNI EN 14511	[kW]	7.74	9.78	14.1	19.1	23.2	26.7	31.0	34.9	39.8
Compressor Absorbed Power	[kW]	2.64	3.23	4.62	6.07	7.3	8.49	10.03	10.95	12.38
Absorbed Power UNI EN 14511 with pumps on board	[kW]	2.55	3.14	4.52	5.94	7.19	8.34	9.89	10.8	12.2
Compressor Absorbed Current	[A]	12.75	15.61	22.3	9.73	11.71	13.62	16.08	17.57	19.86
Total COP	[-]	4.95	5.13	5.16	5.36	5.42	5.36	5.24	5.45	5.49
Total COP UNI EN 14511	[-]	5.13	5.29	5.27	5.48	5.51	5.45	5.32	5.53	5.56
UTILITY Water Flow Rate	[kg/h]	907	1160	1670	2300	2802	3213	3694	4228	4826
DHW Flow Rate	[kg/h]	1359	1714	2462	3342	4056	4671	5413	6110	6953
HEATING B0/W35, 25% glycol										
Heating Capacity	[kW]	6.99	9.03	12.78	17.16	21.5	24.14	28.61	32.07	36.66
Thermal Output UNI EN 14511	[kW]	6.94	8.98	12.7	17.1	21.4	24.1	28.5	32.0	36.6
Compressor Absorbed Power	[kW]	1.62	2.01	2.85	3.81	4.74	5.35	6.24	6.99	7.94
Absorbed Power UNI EN 14511 with pumps on board	[kW]	1.51	1.90	2.73	3.70	4.64	5.24	6.15	6.89	7.91
Compressor Absorbed Current	[A]	7.82	9.7	13.75	6.12	7.61	8.58	10.01	11.2	12.73
COP	[-]	4.32	4.5	4.49	4.5	4.53	4.51	4.58	4.59	4.62
COP UNI EN 14511	[-]	4.61	4.72	4.66	4.62	4.62	4.59	4.64	4.64	4.62
UTILITY Water Flow Rate	[kg/h]	1211	1564	2213	2972	3723	4181	4956	5555	6350
SOURCE Water Flow Rate	[kg/h]	1706	2226	3149	4232	5312	5958	7091	7953	9105
HEATING B10/W35										
Heating Capacity	[kW]	9.05	11.5	16.22	21.81	27.34	30.73	36.37	40.74	46.46
Thermal Output UNI EN 14511	[kW]	9.00	11.5	16.2	21.8	27.3	30.7	36.3	40.7	46.5
Compressor Absorbed Power	[kW]	1.59	2.01	2.82	3.88	4.87	5.45	6.33	7.09	8.23
Absorbed Power UNI EN 14511 with pumps on board	[kW]	1.48	1.91	2.71	3.76	4.75	5.30	6.20	6.94	8.22
Compressor Absorbed Current	[A]	7.69	9.71	13.63	6.22	7.81	8.74	10.16	11.38	13.2
COP	[-]	5.69	5.72	5.75	5.63	5.62	5.64	5.74	5.74	5.65
COP UNI EN 14511	[-]	6.07	6.01	5.98	5.79	5.74	5.78	5.86	5.86	5.65
UTILITY Water Flow Rate	[kg/h]	1567	1992	2810	3777	4736	5323	6300	7056	8046
SOURCE Water Flow Rate	[kg/h]	1293	1646	2323	3110	3898	4384	5209	5833	6629

TECHNICAL DATA		GSE006	GSE009	GSE012	GSE017	GSE022	GSE025	GSE030	GSE033	GSE040
DHW B10/W55										
DHW Heating capacity	[kW]	8.08	10.33	14.53	19.64	24.4	27.55	32.27	36.14	41.38
Thermal Output UNI EN 14511	[kW]	8.03	10.3	14.5	19.6	24.4	27.5	32.2	36.1	41.3
Compressor Absorbed Power	[kW]	2.63	3.22	4.61	6.07	7.32	8.49	10.02	10.97	12.41
Absorbed Power UNI EN 14511 with pumps on board	[kW]	2.54	3.12	4.50	5.96	7.20	8.34	9.88	10.8	12.4
Compressor Absorbed Current	[A]	12.72	15.56	22.27	9.74	11.74	13.62	16.08	17.59	19.91
COP	[-]	3.07	3.21	3.15	3.23	3.33	3.24	3.22	3.3	3.33
COP UNI EN 14511	[-]	3.17	3.30	3.21	3.28	3.38	3.30	3.26	3.34	3.34
DHW Flow Rate	[kg/h]	1409	1802	2535	3425	4256	4806	5628	6304	7219
SOURCE Water Flow Rate	[kg/h]	956	1247	1742	2379	2993	3342	3902	4413	5077
Maximum electric absorption										
Electrical power supply		single-phase 230/1/50			three-phase 400/3+N/50					
Tot FLA	[A]	15	19	28	12	15	17	20	22	24
Booster current LRA	[A]	67	98	116	75	101	111	118	118	140
Noise emission										
Lw base unit noise power level	[dBA]	64	66	66	73	70	72	72	73	74
Lw low-noise unit noise power level	[dBA]	60	62	62	69	66	68	68	69	70
Compressor										
Type of compressor		Scroll								
Electric motor technology		on/off								
N° compressors/cooling circuits		1/1								
Dimensional drawing/Frame		F1	F1	F1	F1	F1	F1	F2	F2	F2

WARNING **The data for the power supply values are meant as a guide. In any case refer to the unit's wiring diagram.**

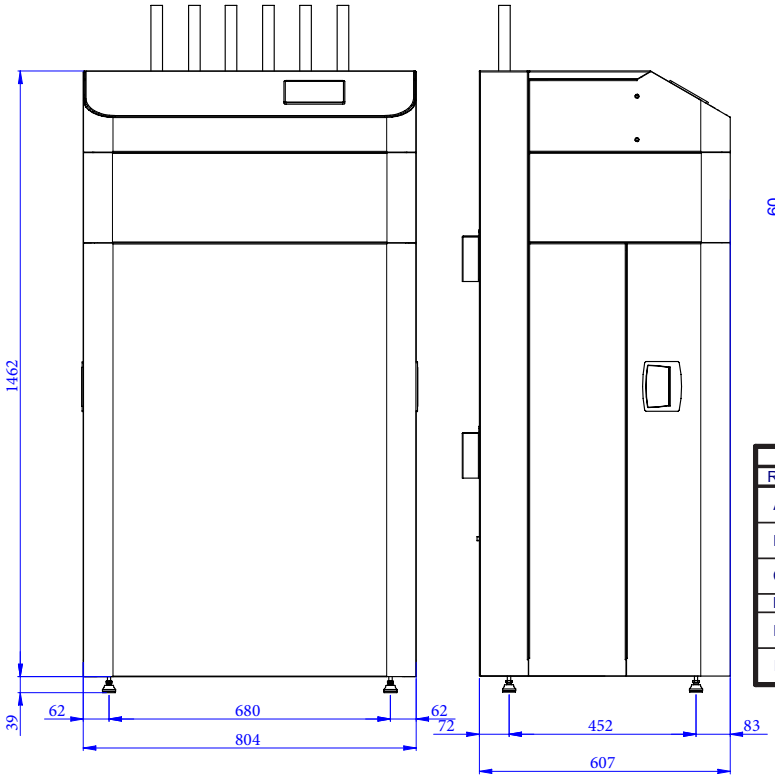
FRAME 1 OVERALL DRAWINGS

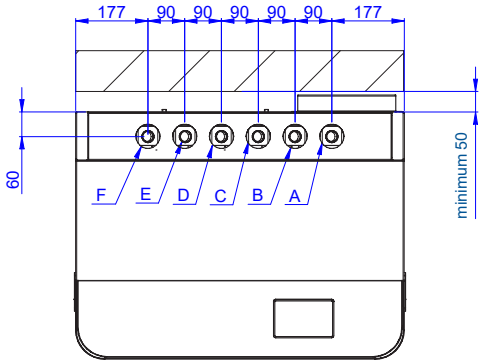




CONNESSIONI IDRAULICHE - HIDRAULIC CONNECTIONS			
Rif.	Attacchi - Connections	TIPO - TYPE	
A	OUT DISSIPAZIONE - DISSIPATOR WATER OUTLET	Tubo Rame	Ø28
B	IN DISSIPAZIONE - DISSIPATOR WATER INLET	Tubo Rame	Ø28
C	OUT UTENZA - USER WATER OUTLET	Tubo Rame	Ø28
D	IN UTENZA - USER WATER INLET	Tubo Rame	Ø28
E	OUT A.C.S - HEAT RECOVERY WATER OUTLET	Tubo Rame	Ø28
F	IN A.C.S - HEAT RECOVERY WATER INLET	Tubo Rame	Ø28

FRAME 2 OVERALL DRAWINGS





CONNESSIONI IDRAULICHE - HIDRAULIC CONNECTIONS			
Rif.	Attacchi - Connections	TIPO - TYPE	
A	OUT DISSIPAZIONE - DISSIPATOR WATER OUTLET	Tubo Rame	Ø35
B	IN DISSIPAZIONE - DISSIPATOR WATER INLET	Tubo Rame	Ø35
C	OUT UTENZA - USER WATER OUTLET	Tubo Rame	Ø35
D	IN UTENZA - USER WATER INLET	Tubo Rame	Ø35
E	OUT A.C.S - HEAT RECOVERY WATER OUTLET (optional)	Tubo Rame	Ø35
F	IN A.C.S - HEAT RECOVERY WATER INLET (optional)	Tubo Rame	Ø35

WARNING **Dimensional drawings are meant as a guide. Please check the dimensional drawing enclosed with the unit for an accurate reference.**

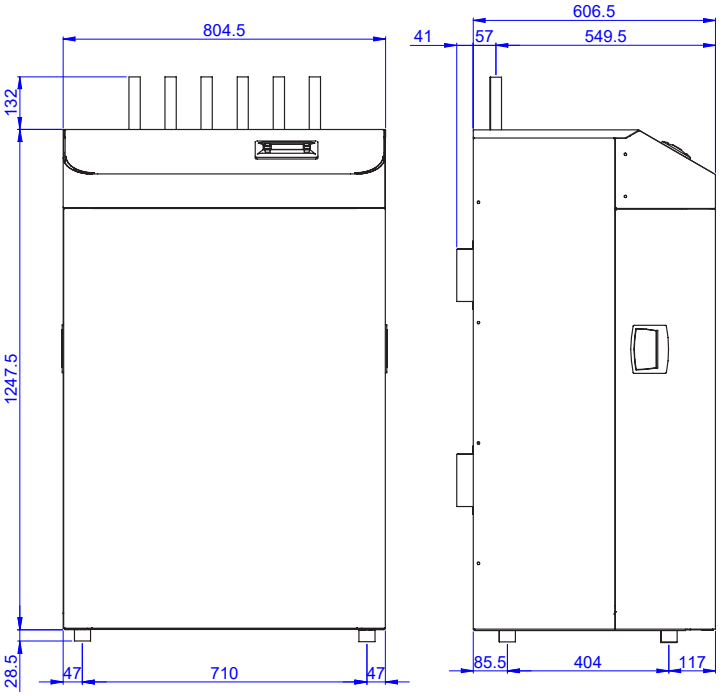
WARNING **The manufacturer reserves the right to make improvements to the unit due to its development.**

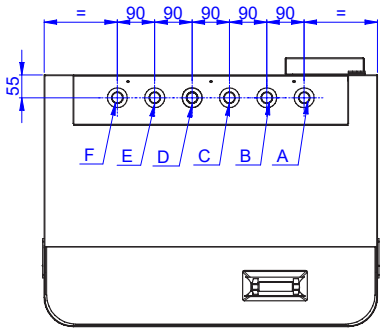
TECHNICAL DATA		ENE006	ENE009	ENE012	ENE017	ENE022	ENE025	ENE030	ENE033	ENE040
COOLING B30/W7										
Cooling Capacity	[kW]	7.06	8.86	12.7	17.05	20.93	24.01	28.12	31.85	35.92
Cooling Capacity UNI EN 14511	[kW]	7.11	8.92	12.7	17.1	21.0	24.1	28.2	31.9	36.0
Compressor Absorbed Power	[kW]	1.61	2.03	2.89	4.06	4.94	5.55	6.48	7.27	8.4
Absorbed Power UNI EN 14511 with pumps on board	[kW]	1.50	1.91	2.77	3.93	4.80	5.38	6.32	7.10	8.31
Compressor Absorbed Current	[A]	7.78	9.78	13.96	6.51	7.93	8.9	10.39	11.66	13.47
EER	[-]	4.39	4.38	4.39	4.2	4.24	4.33	4.34	4.38	4.28
EER UNI EN 14511	[-]	4.74	4.67	4.61	4.36	4.37	4.47	4.46	4.50	4.33
UTILITY Water Flow Rate	[kg/h]	1213	1522	2180	2929	3595	4123	4830	5470	6168
SOURCE Water Flow Rate	[kg/h]	1488	1869	2675	3622	4439	5071	5937	6713	7603
COOLING B30/W18										
Cooling Capacity	[kW]	9.95	12.38	17.59	23.49	28.96	32.98	38.69	44.04	49.51
Cooling Capacity UNI EN 14511	[kW]	10.00	12.4	17.6	23.5	29.0	33.0	38.7	44.1	49.5
Compressor Absorbed Power	[kW]	1.59	2.05	2.87	4.24	5.06	5.83	6.7	7.51	8.86
Absorbed Power UNI EN 14511 with pumps on board	[kW]	1.48	1.98	2.76	4.16	5.02	5.79	6.68	7.53	8.95
Compressor Absorbed Current	[A]	7.7	9.92	13.86	6.8	8.12	9.34	10.75	12.04	14.2
EER	[-]	6.24	6.03	6.13	5.54	5.72	5.66	5.77	5.86	5.59
EER UNI EN 14511	[-]	6.74	6.28	6.39	5.66	5.77	5.71	5.79	5.85	5.53
UTILITY Water Flow Rate	[kg/h]	1716	2136	3034	4052	4995	5689	6675	7596	8541
SOURCE Water Flow Rate	[kg/h]	1986	2482	3518	4766	5848	6671	7805	8863	10033
HEATING B0/W35, 25% glycol										
Heating Capacity	[kW]	6.99	9.03	12.78	17.16	21.5	24.14	28.61	32.07	36.66
Thermal Output UNI EN 14511	[kW]	6.94	8.98	12.7	17.1	21.4	24.1	28.5	32.0	36.6
Compressor Absorbed Power	[kW]	1.62	2.01	2.85	3.81	4.74	5.35	6.24	6.99	7.94
Absorbed Power UNI EN 14511 with pumps on board	[kW]	1.51	1.90	2.73	3.70	4.64	5.24	6.15	6.89	7.91
Compressor Absorbed Current	[A]	7.82	9.7	13.75	6.12	7.61	8.58	10.01	11.2	12.73
COP	[-]	4.32	4.5	4.49	4.5	4.53	4.51	4.58	4.59	4.62
COP UNI EN 14511	[-]	4.61	4.72	4.66	4.62	4.62	4.59	4.64	4.64	4.62
UTILITY Water Flow Rate	[kg/h]	1211	1564	2213	2972	3723	4181	4956	5555	6350
SOURCE Water Flow Rate	[kg/h]	1706	2226	3149	4232	5312	5958	7091	7953	9105
HEATING B10/W35										
Heating Capacity	[kW]	9.05	11.5	16.22	21.81	27.34	30.73	36.37	40.74	46.46
Thermal Output UNI EN 14511	[kW]	9.00	11.5	16.2	21.8	27.3	30.7	36.3	40.7	46.5
Compressor Absorbed Power	[kW]	1.59	2.01	2.82	3.88	4.87	5.45	6.33	7.09	8.23
Absorbed Power UNI EN 14511 with pumps on board	[kW]	1.48	1.91	2.71	3.76	4.75	5.30	6.20	6.94	8.22
Compressor Absorbed Current	[A]	7.69	9.71	13.63	6.22	7.81	8.74	10.16	11.38	13.2
COP	[-]	5.69	5.72	5.75	5.63	5.62	5.64	5.74	5.74	5.65
COP UNI EN 14511	[-]	6.07	6.01	5.98	5.79	5.74	5.78	5.86	5.86	5.65
UTILITY Water Flow Rate	[kg/h]	1567	1992	2810	3777	4736	5323	6300	7056	8046
SOURCE Water Flow Rate	[kg/h]	1293	1646	2323	3110	3898	4384	5209	5833	6629

TECHNICAL DATA		ENE006	ENE009	ENE012	ENE017	ENE022	ENE025	ENE030	ENE033	ENE040
DHW B10/W55										
DHW Heating capacity	[kW]	8.08	10.33	14.53	19.64	24.4	27.55	32.27	36.14	41.38
Thermal Output UNI EN 14511	[kW]	8.03	10.3	14.5	19.6	24.4	27.5	32.2	36.1	41.3
Compressor Absorbed Power	[kW]	2.63	3.22	4.61	6.07	7.32	8.49	10.02	10.97	12.41
Absorbed Power UNI EN 14511 with pumps on board	[kW]	2.54	3.12	4.50	5.96	7.20	8.34	9.88	10.8	12.4
Compressor Absorbed Current	[A]	12.72	15.56	22.27	9.74	11.74	13.62	16.08	17.59	19.91
COP	[-]	3.07	3.21	3.15	3.23	3.33	3.24	3.22	3.3	3.33
COP UNI EN 14511	[-]	3.17	3.30	3.21	3.28	3.38	3.30	3.26	3.34	3.34
DHW Flow Rate	[kg/h]	1409	1802	2535	3425	4256	4806	5628	6304	7219
SOURCE Water Flow Rate	[kg/h]	956	1247	1742	2379	2993	3342	3902	4413	5077
Maximum electric absorption										
Electrical power supply		single-phase 230/1/50			three-phase 400/3+N/50					
Tot FLA	[A]	15	19	28	12	15	17	20	22	24
Booster current LRA	[A]	67	98	116	75	101	111	118	118	140
Noise emission										
Lw base unit noise power level	[dBA]	64	66	66	73	70	72	72	73	74
Lw low-noise unit noise power level	[dBA]	60	62	62	69	66	68	68	69	70
Compressor										
Type of compressor		Scroll								
Electric motor technology		on/off								
N° compressors/cooling circuits		1/1								
Dimensional drawing/Frame		F1	F1	F1	F1	F1	F1	F2	F2	F2
Dimensional drawing/Frame		F1	F1	F1	F1	F1	F1	F2	F2	F2

WARNING **The data for the power supply values are meant as a guide. In any case refer to the unit's wiring diagram.**

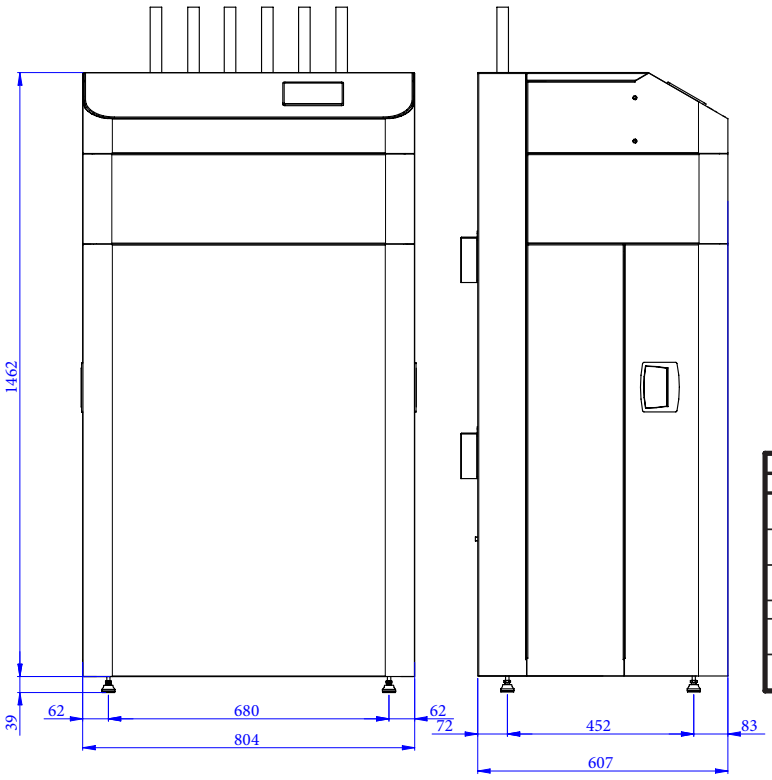
FRAME 1 OVERALL DRAWINGS

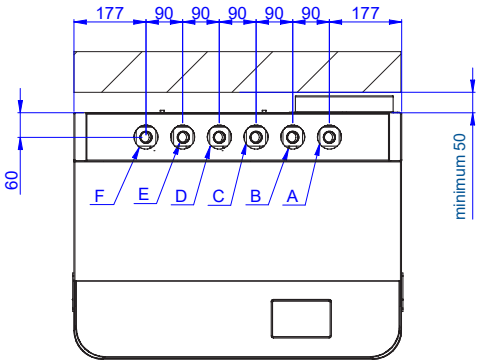




CONNESSIONI IDRAULICHE - HIDRAULIC CONNECTIONS			
Rif.	Attacchi - Connections	TIPO - TYPE	
A	OUT DISSIPAZIONE - DISSIPATOR WATER OUTLET	Tubo Rame	Ø28
B	IN DISSIPAZIONE - DISSIPATOR WATER INLET	Tubo Rame	Ø28
C	OUT UTENZA - USER WATER OUTLET	Tubo Rame	Ø28
D	IN UTENZA - USER WATER INLET	Tubo Rame	Ø28
E	OUT A.C.S - HEAT RECOVERY WATER OUTLET	Tubo Rame	Ø28
F	IN A.C.S - HEAT RECOVERY WATER INLET	Tubo Rame	Ø28

FRAME 2 OVERALL DRAWINGS





CONNESSIONI IDRAULICHE - HIDRAULIC CONNECTIONS			
Rif.	Attacchi - Connections	TIPO - TYPE	
A	OUT DISSIPAZIONE - DISSIPATOR WATER OUTLET	Tubo Rame	Ø35
B	IN DISSIPAZIONE - DISSIPATOR WATER INLET	Tubo Rame	Ø35
C	OUT UTENZA - USER WATER OUTLET	Tubo Rame	Ø35
D	IN UTENZA - USER WATER INLET	Tubo Rame	Ø35
E	OUT A.C.S - HEAT RECOVERY WATER OUTLET (optional)	Tubo Rame	Ø35
F	IN A.C.S - HEAT RECOVERY WATER INLET (optional)	Tubo Rame	Ø35

WARNING **Dimensional drawings are meant as a guide. Please check the dimensional drawing enclosed with the unit for an accurate reference.**

WARNING **The manufacturer reserves the right to make improvements to the unit due to its development.**

3.2 OPERATING LIMITS

It's possible to produce water at temperatures from -5°C to 5°C using glycol mixture that lower the freezing point.
In the following table are calculate the freezing temperatures of the mixture in according to the quantity of the glycol used.
For details please contact the nearest Eneren retailer.

Percentage in glycol by weight	%	0 %	10 %	15%	20%	25 %	30 %	40 %	50 %
Freezing temperature of mixture with etylene glycol	°C	0	-3	- 5	-8	-11	-14	-22	-34
Freezing temperature of mixture with propylene glycol	°C	0	-3	-5	-7	-10	-13	-21	-33

Corrective factors in according to the quantity of glycol in the mixture:

	Percentage in glycol by weight	%	0 %	10 %	20%	30 %	40 %
ETHYLENE GLYCOL	Thermal power corrective factor		1,000	0,998	0,994	0,989	0,983
	Water flow corrective factor		1,000	1,047	1,094	1,140	1,199
	Pressure drops corrective factor		1,000	1,157	1,352	1,585	1,860
PROPYLENE GLYCOL	Thermal power corrective factor		1,000	0,996	0,985	0,971	0,960
	Water flow corrective factor		1,000	1,022	1,043	1,070	1,098
	Pressure drops corrective factor		1,000	1,111	1,307	1,532	1,777

ATTENZIONE **The freezing temperature of the mixture must be at least 5°C smaller than the outlet water temperature expected of the evaporator side.**

WARNING **All the temperatures on the perimeter of the operating areas can only be reached as transients and if the unit runs beyond these limits for a prolonged time, the software on board will implement corrective actions to restore the unit within the operating limits.**

Heat transfer fluid:	water or mixture of water and max 30% glycol antifreeze
Maximum water side pressure:	5 bar
Maximum pressure on high pressure side	41.5 bar-r for GSP-ENX ; 45.0 bar-r for GSE-ENE
Maximum ambient Temp of the unit	+42 °C
Minimum ambient Temp of the unit	-10 °C
Maximum pressure on low pressure side	29 bar-r (*)
Power supply voltage:	+/- 10% compared to plate voltage
Maximum storage Temp of the unit	+42 °C
Minimum storage Temp of the unit	-20 °C (limit determined by on board electronics)

(*) this value can only be reached during storage and determines the saturation pressure of 30 bar-r of the refrigerant on the low pressure side of the circuit (value which determines its limits).

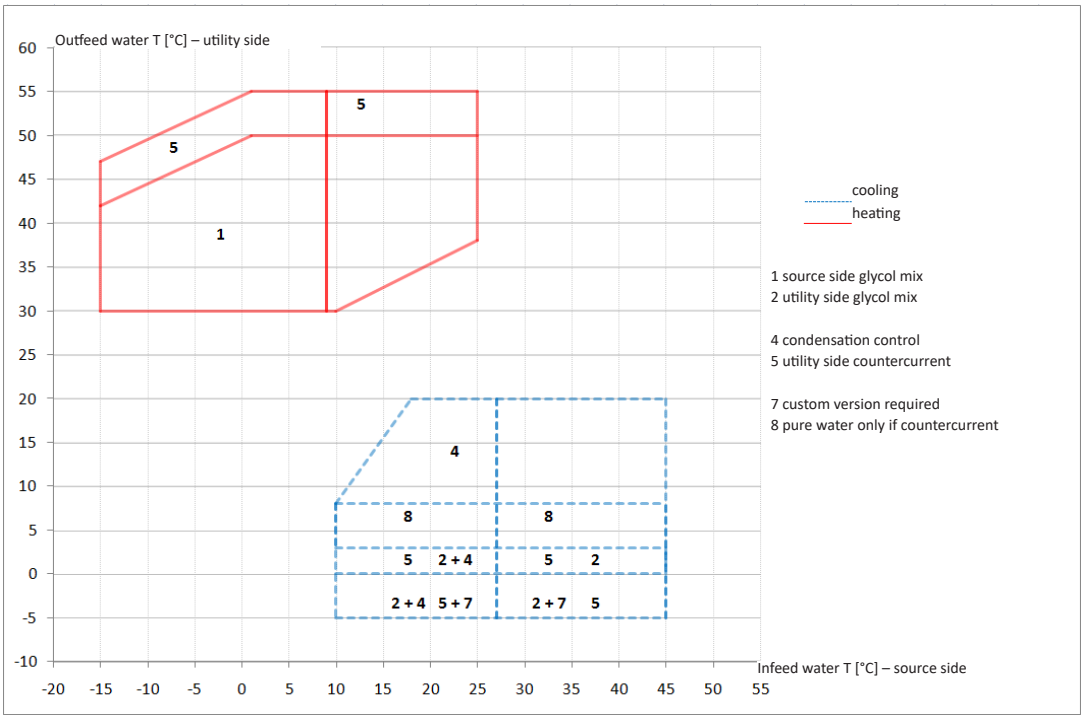
Water flow to evaporator

The nominal flow rate refers to a temperature differential of 5° C between inlet and outlet water, in relation to the cooling capacity provided at the nominal water temperatures (12/7 °C).
The maximum allowable flow rate is associated with a temperature differential of 3 °C. Higher flow rates cause unacceptable drops in pressure.
The minimum allowable flow rate is achieved with a temperature differential of 8 °C. Lower flow rates may result in low evaporation temperatures, which could trigger the safety devices and stop the unit. They may also cause an incorrect distribution or heat transfer in a non-turbulent or not fully turbulent flow.

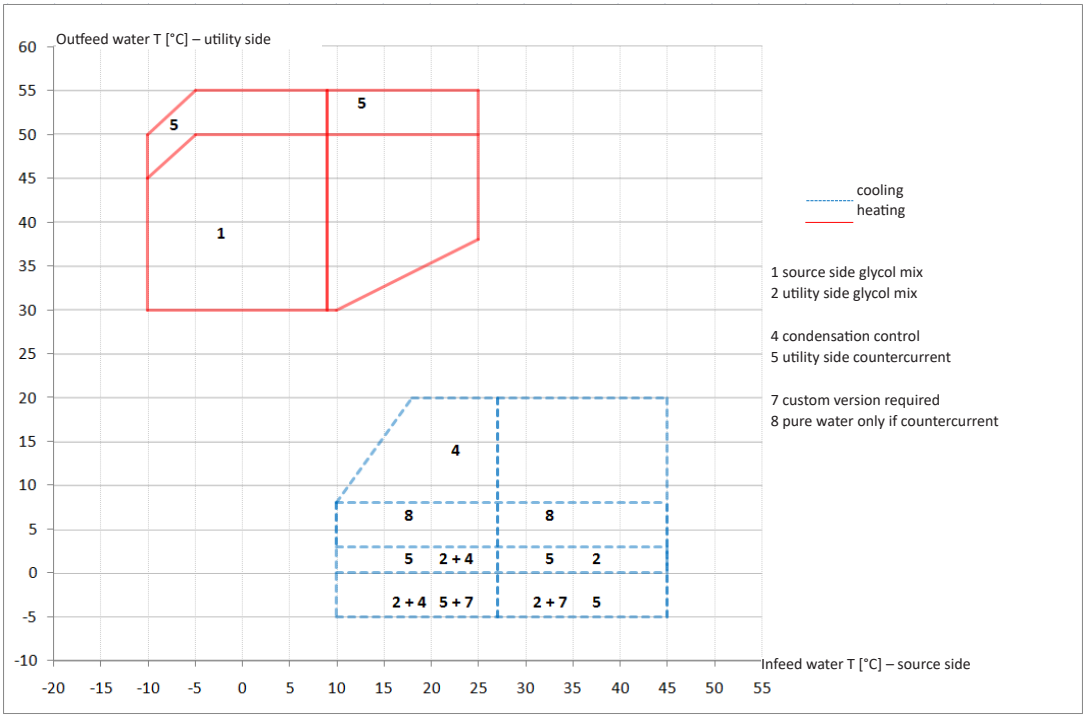
ATTENZIONE **The y-shaped filters (charged to the customer or available as an option in the supply of the unit) must install at the input of the condenser's hydraulic circuit and of the evaporator. If the installation not respect this conditions will invalidate the warranty.**

3.2.1 GSP operating limits

GSP 12 operating limits for the following produced water and source circuit temperature:

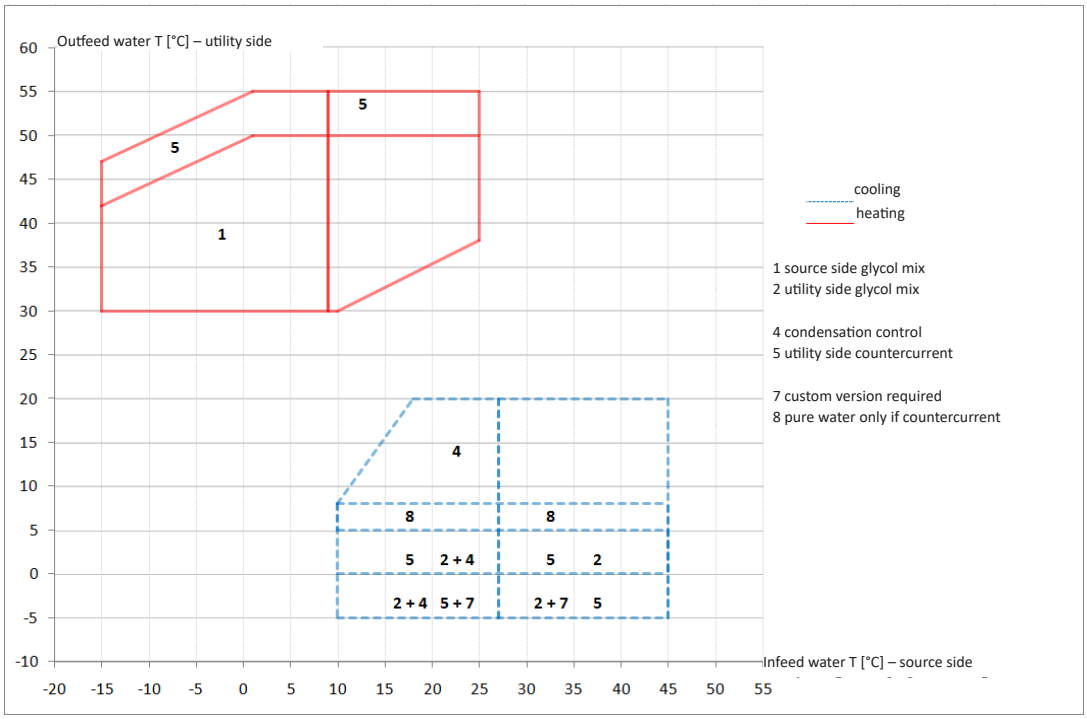


GSP 22-33-44 operating limits for the following produced water and source circuit temperature:

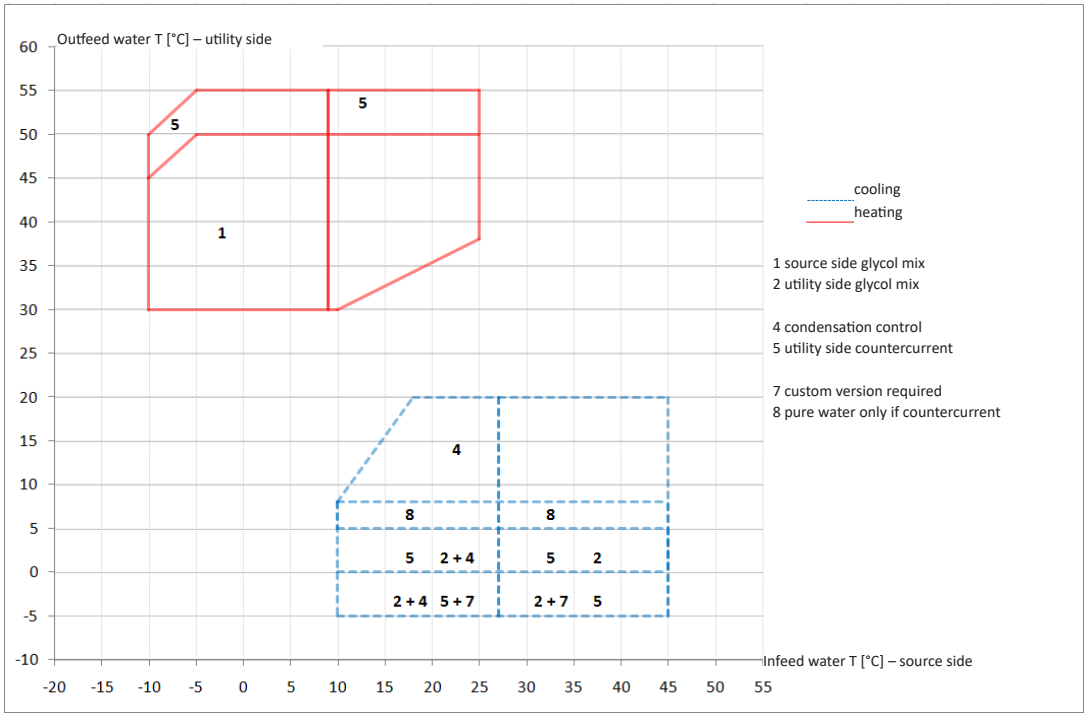


3.2.2 ENX operating limits

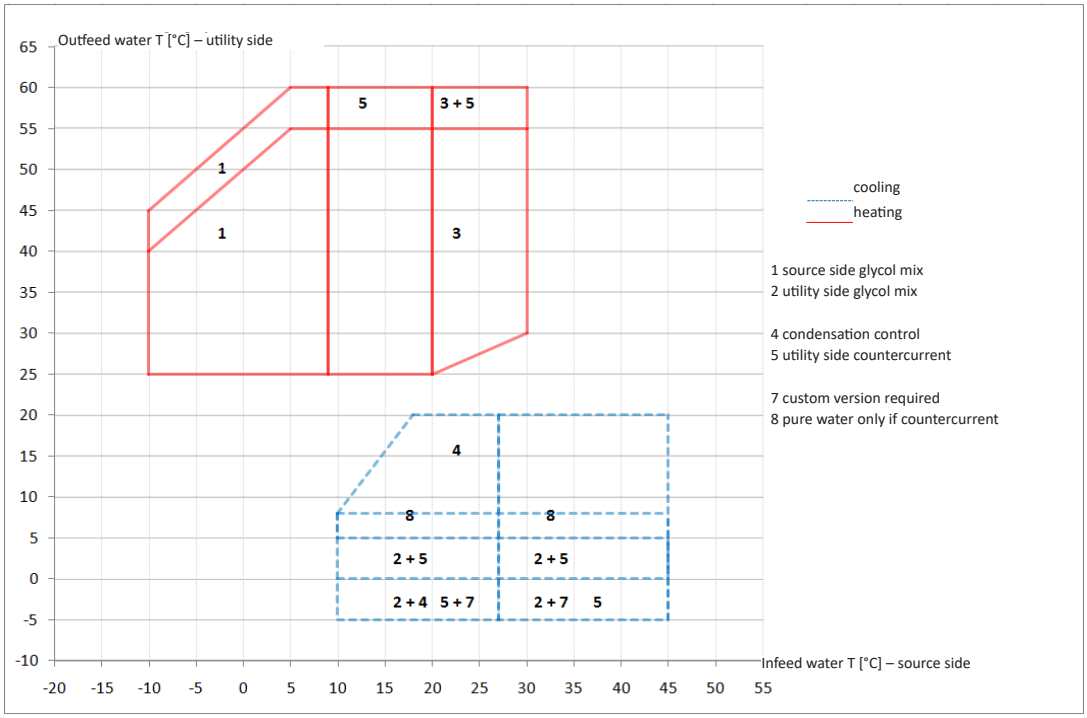
ENX 012 operating limits for the following produced water and source circuit temperature:



ENX 022 and ENX 033 operating limits for the following produced water and source circuit temperature:



3.2.3 GSE/ENE operating limits



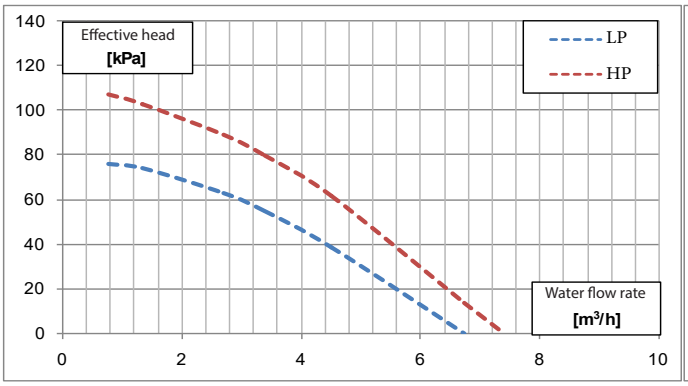
3.3 CHARACTERISTIC CURVES OF THE CIRCULATION PUMPS

The charts displayed in this paragraph show the useful head of the HP pumps and LP pumps mounted on board the units.

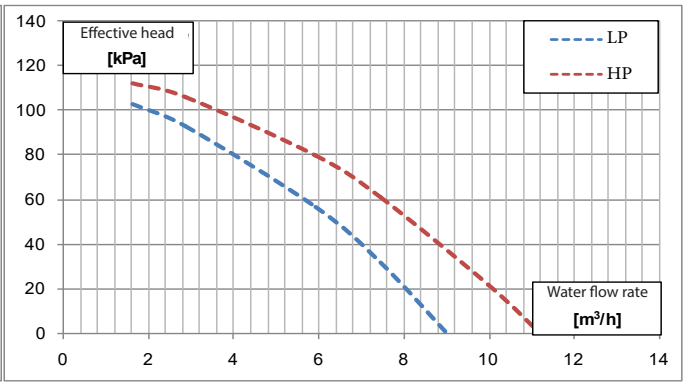
3.3.1 GSP unit

Utility side circulation pumps:

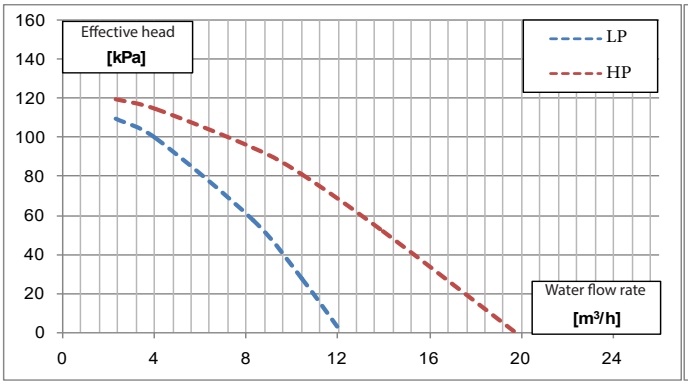
GSP 012



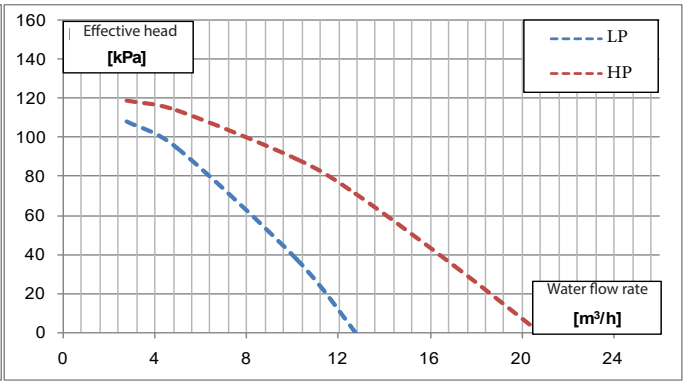
GSP 022



GSP 033

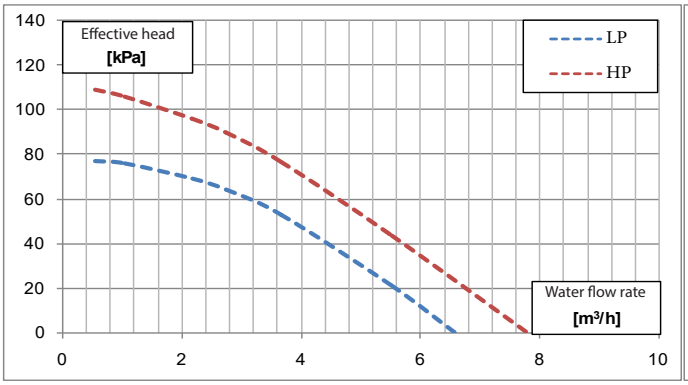


GSP 044

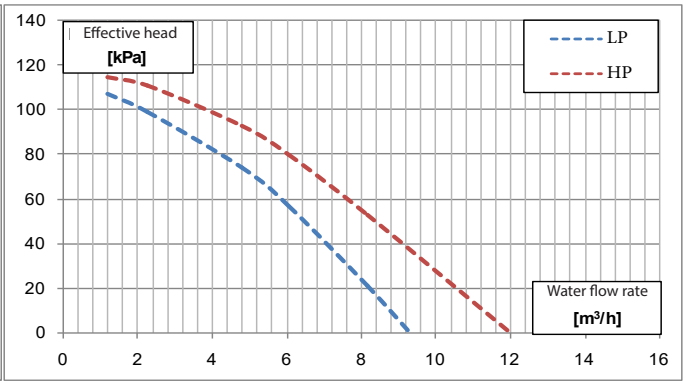


Source side circulation pumps:

GSP 012



GSP 022



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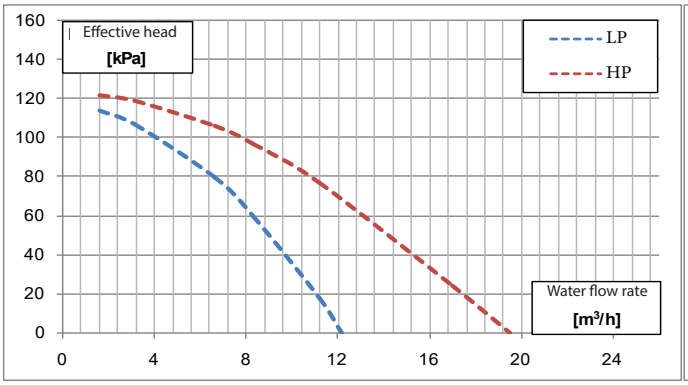

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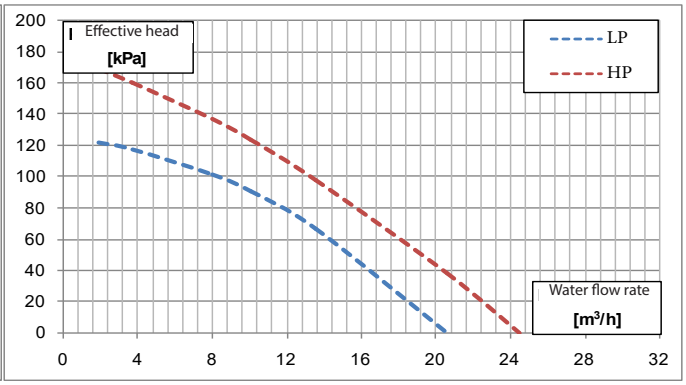
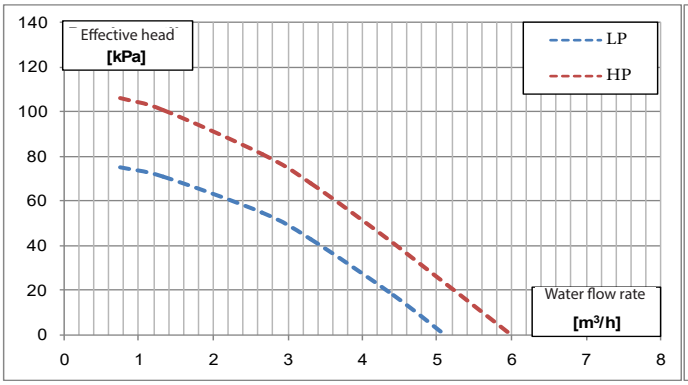


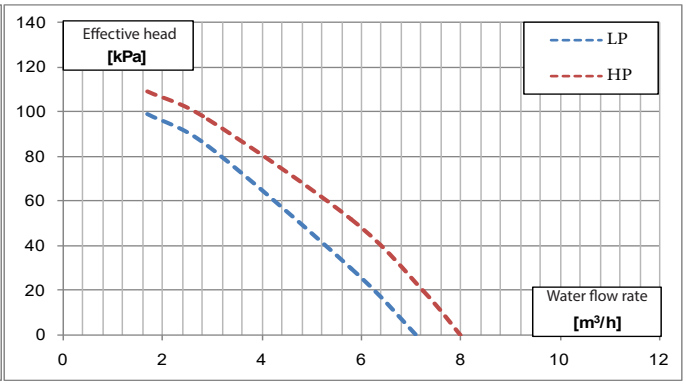
3.3.2 ENX unit

Utility side circulation pumps:

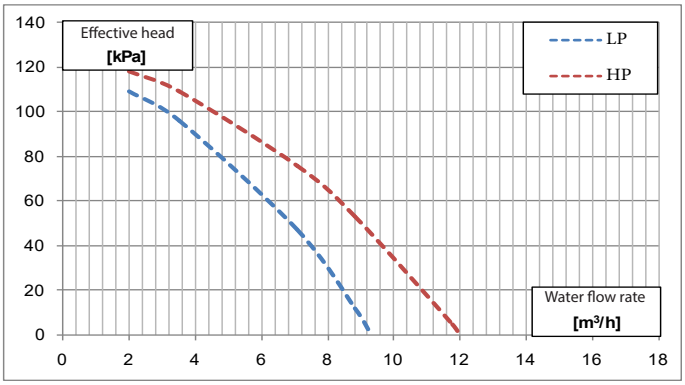
ENX 012



ENX 022

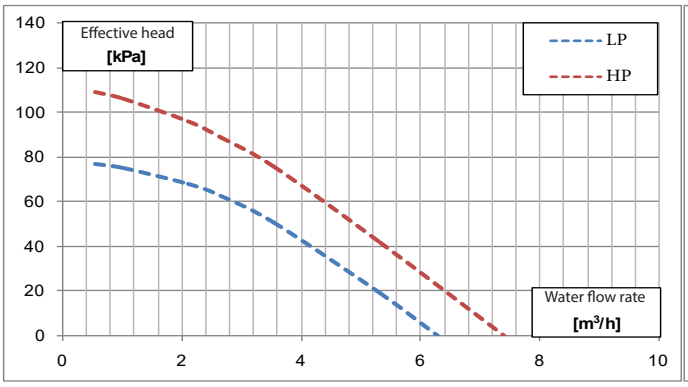


ENX 033



Source side circulation pumps:

ENX 012



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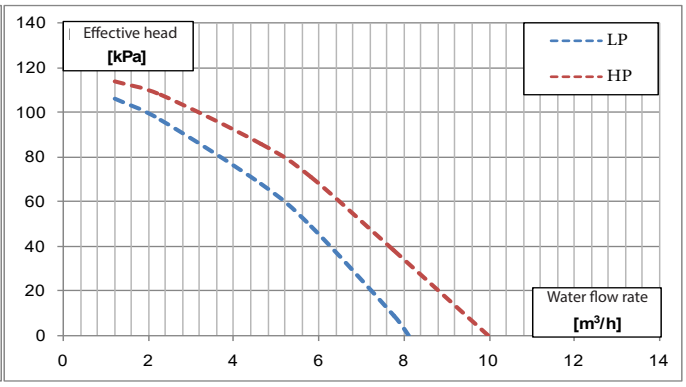

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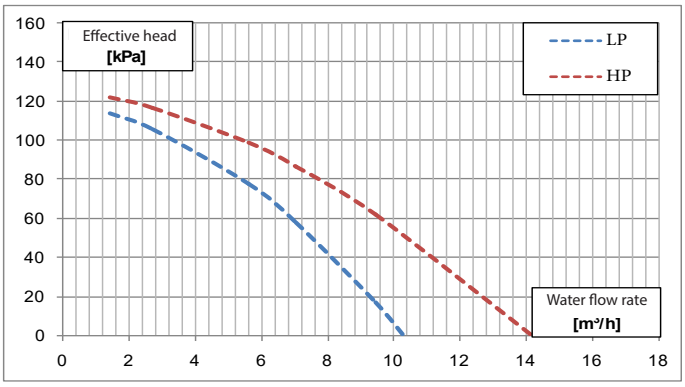
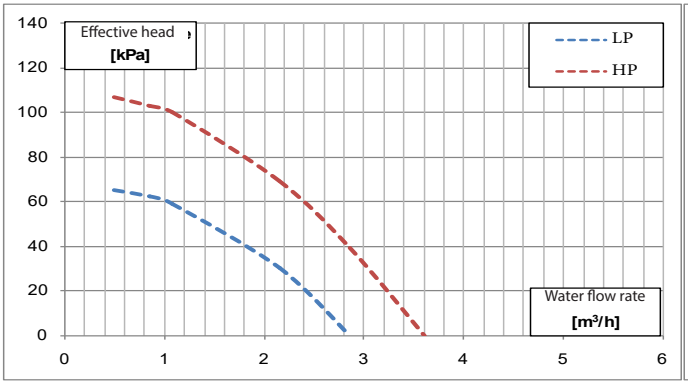


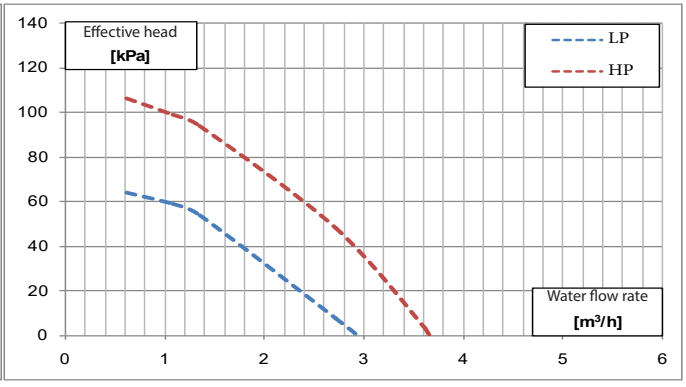
3.3.3 GSE/ENE unit

Utility side circulation pumps:

GSE/ENE 006



GSE/ENE 009



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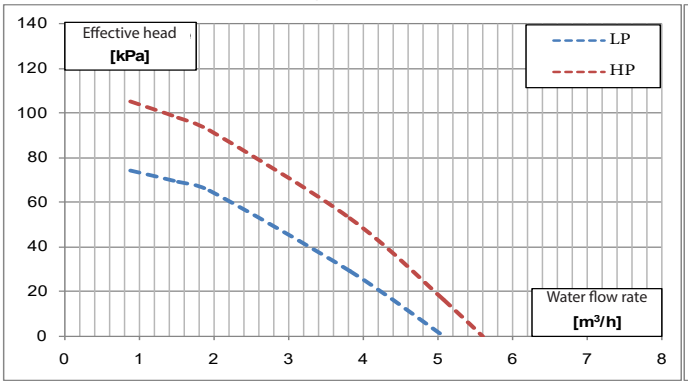
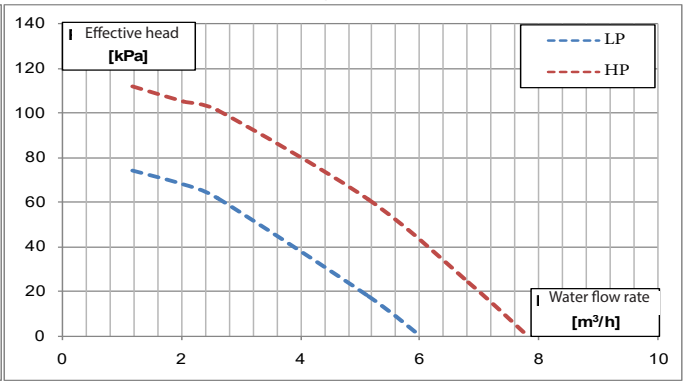


GSE/ENE 017



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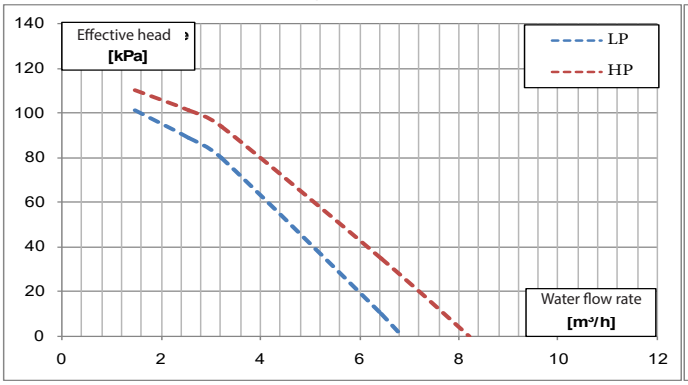
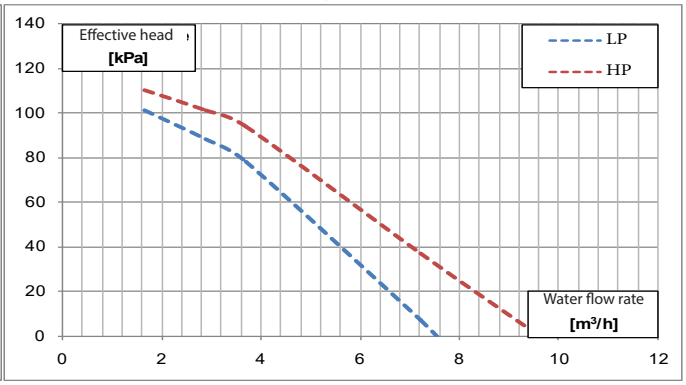
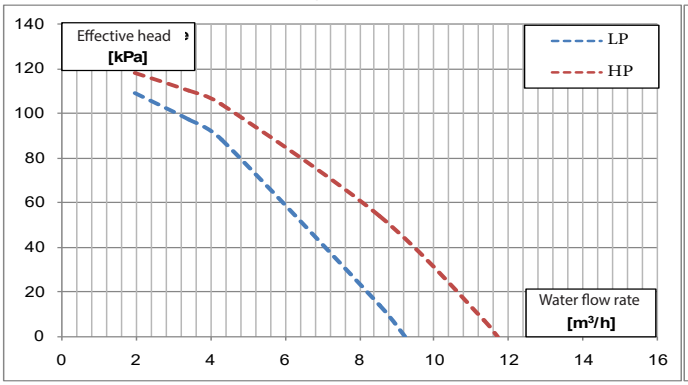


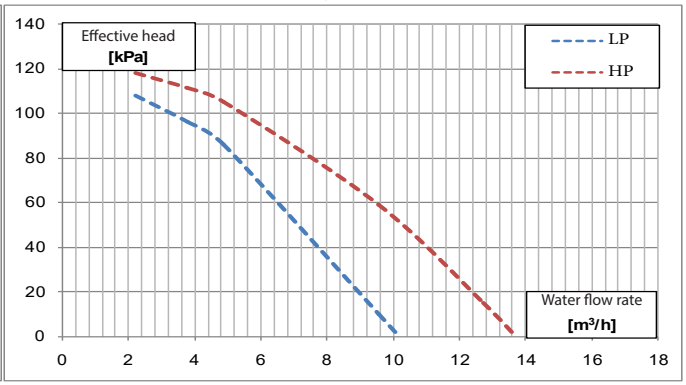
GSE/ENE 025



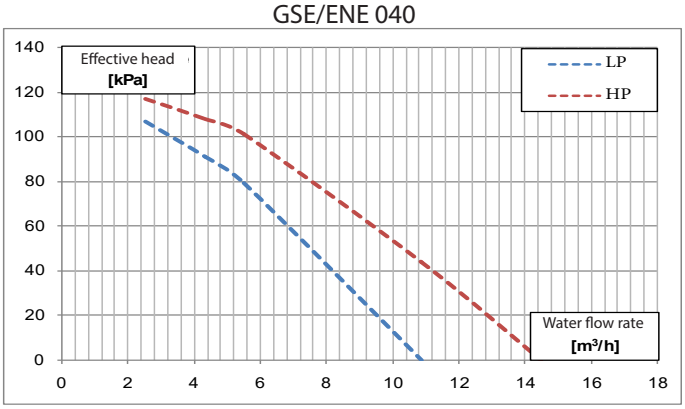
GSE/ENE 030



GSE/ENE 033

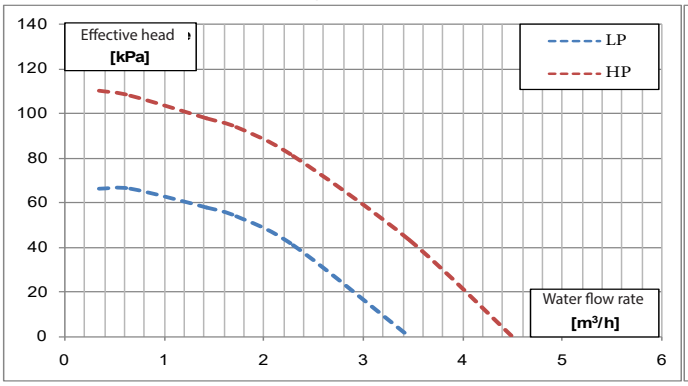


GSE/ENE 040

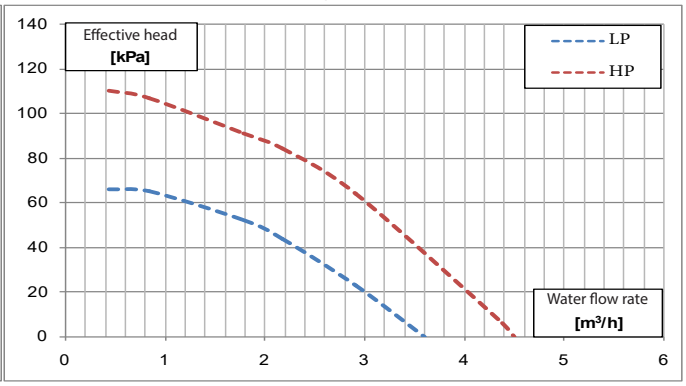


Source side circulation pumps:

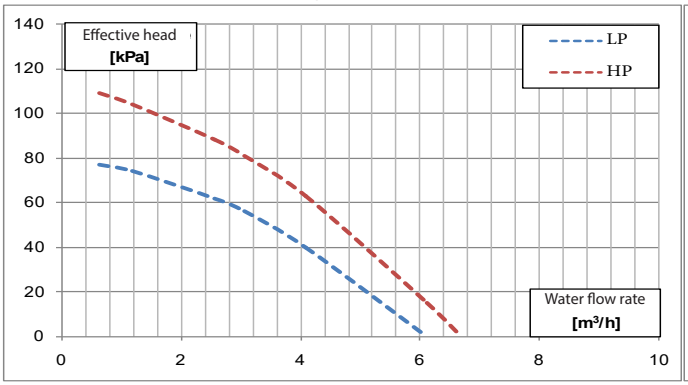
GSE/ENE 006



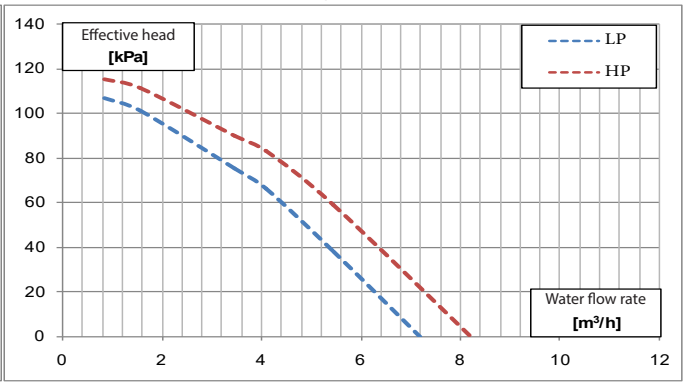
GSE/ENE 009



GSE/ENE 012



GSE/ENE 017



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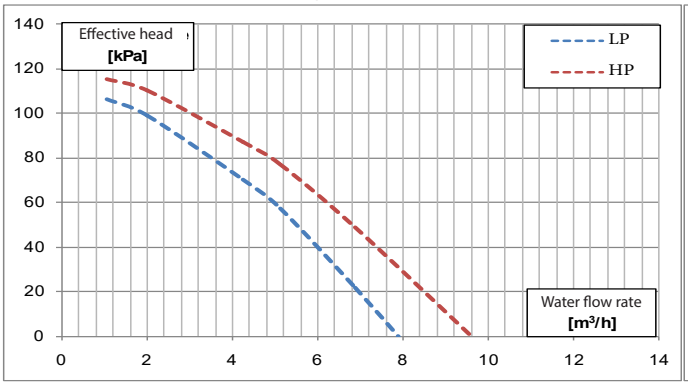

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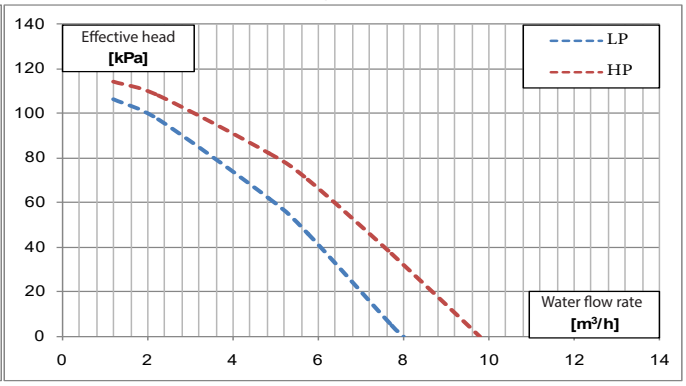

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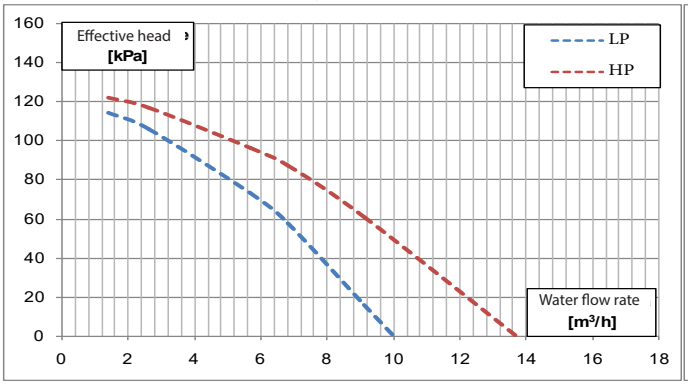

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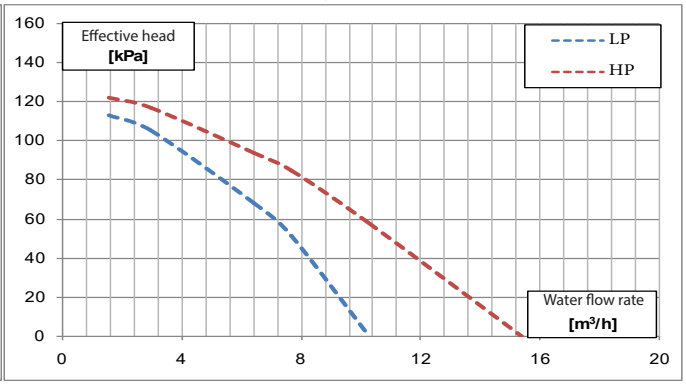

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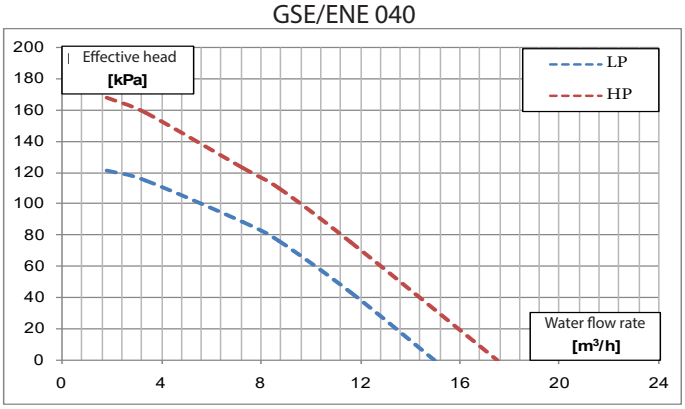
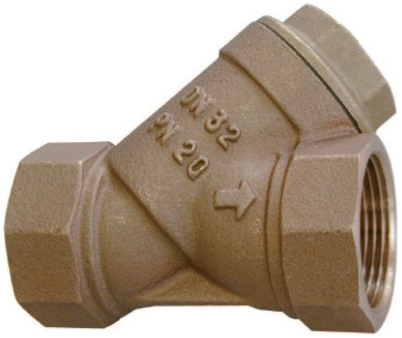


3.4 INFORMATION ABOUT Y-SHAPED FILTERS AND 2-WAY VALVES

The following tables report the technical specifications of Y-shaped filters to be installed at the heat pump's inlet. Always follow the indications on the minimum diameter of the connecting piping reported in the table.

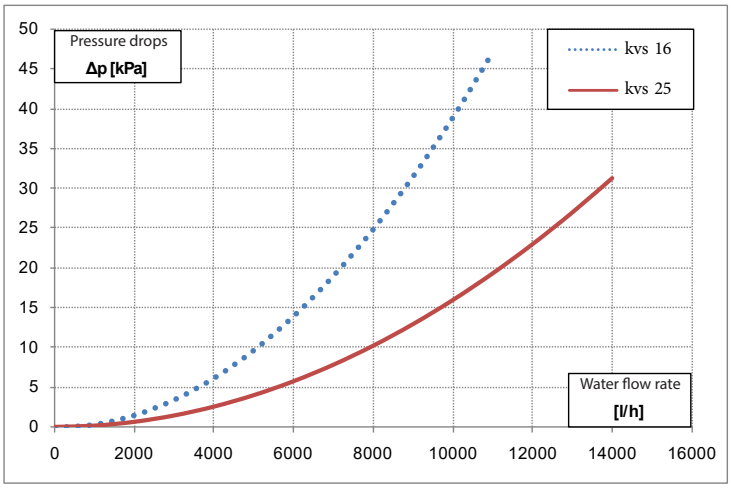
- Bronze body
- SN 5 UNI-EN1982 DIN 50930/6
- Bronze cap CW 617 N - UNI-EN12165
- Body gasket BETAFLEX 71
- Sandblasted finish
- Thread EN-ISO 228/1
- AISI 304 stainless steel rhomboid micro-stretched sheet metal filter



GSP/ENX	size	012	022	033	044
Flow rate under nominal conditions	kg/h	3600	8000	11000	12500
Filtering degree	µ	400	500	500	500
kv	m3/h	12.5	24.5	36	36
Filter pressure drops	kPa	8	11	9	12
Minimum filter diameter requested	**inches**	**1"**	**1"1/2**	**2"**	**2"**

GSE/ENE	size	006	009	012	017	022	025	030	033	040
Flow rate under nominal conditions	kg/h	2100	2600	3700	5000	6200	7000	8200	9300	10600
Filtering degree	µ	400	400	400	500	500	500	500	500	500
kv	m3/h	12.5	12.5	12.5	24.5	24.5	24.5	24.5	36	36
Filter pressure drops	kPa	3	4	9	4	6	8	11	7	9
Minimum filter diameter requested	**inches**	**1"**	**1"**	**1"**	**1"1/2**	**1"1/2**	**1"1/2**	**1"1/2**	**2"**	**2"**

Pressure drops of 2-way valves:



3.5 CALIBRATION OF CONTROL DEVICES

3.5.1 General information

All the control devices are set and tested in the factory before the unit is dispatched. However, after the unit has been in service for a reasonable period of time you can perform a check on the operating and safety devices. The settings are shown in Tables I and II.

DANGER **All the servicing operations performed on the control equipment must be carried out EXCLUSIVELY BY QUALIFIED PERSONNEL: incorrect calibration values can cause serious damage to the unit and to people.**

Many of the operating parameters and system settings are configured by means of the microprocessor control and are protected by passwords.

TABLE I – SETTING OF CONTROL DEVICES

CONTROL DEVICE		SET POINT	DIFFERENTIAL
Service thermostat [CS]	°C	12	4
Service thermostat [HS]	°C	40	4

TABLE II – SETTING OF SAFETY - CONTROL DEVICES

CONTROL DEVICE		ACTIVATION	DIFFERENTIAL	RE-ACTIVATION
Anti-freeze thermostat	°C	+4	1	Automatic
ENX/GSP maximum pressure safety switch	bar	41.5	-8.5	Manual
ENE/GSE maximum pressure safety switch	bar	45	-12	Manual
Modulating condensation control	bar	18	10	-
Minimum time lapse between two compressor's start-ups	s	450	-	-
Flow switch alarm delay	s	15 (start-up)	5 (running)	-
Low pressure alarm delay	s	0	-	-

3.5.2 Maximum pressure switch

The high pressure switch is of the manually reset type and classifiable as category IV under 97/23 EC. It directly stops the compressor when the discharge pressure exceeds the set value.

WARNING **Any kind of block or alarm must be promptly reported to the After Sales Service!**

The high pressure switch must be manually reset; this is possible only when the pressure falls below the set differential (see Table II).

3.5.3 Service thermostat

This function starts and stops the compressors according to the demand for chilled water, as determined by a sensor placed at the evaporator inlet [water returning from the system].
This device is a function included in the microprocessor control and works with a proportional band width that may be set as desired.

3.5.4 Anti-freeze thermostat function

The anti-freeze sensor situated at the evaporator outlet detects the presence of excessively low temperatures and stops the unit. Together with the flow switch and low pressure switch, this device protects the evaporator from the risk of freezing as a result of faults in the water circuit.
This device is a function included in the microprocessor control.

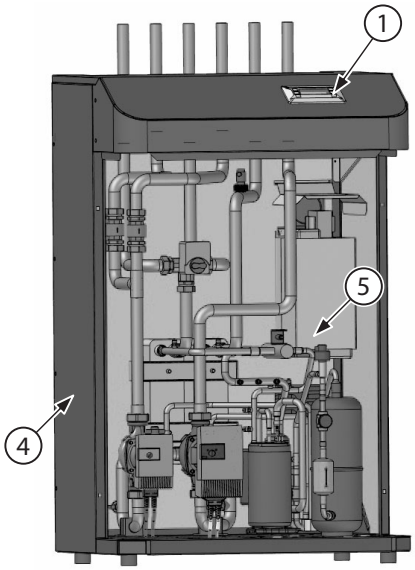
WARNING **If there are any alarms relating to the intervention of the protections described, the unit must request the intervention of the Authorised Technical Service Centre, otherwise the warranty will be considered null and void.**

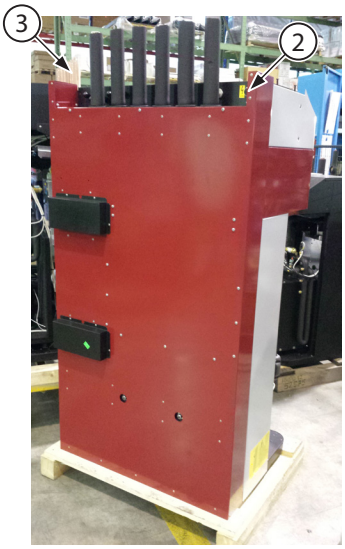
4 - INSPECTION, TRANSPORT AND POSITIONING

4.1 INSPECTION

The unit left the factory in perfect conditions, however when receiving the unit verify its integrity. Immediately report any damage to the carrier and write it down on the Delivery Note before signing it.
The manufacturer or its agent must be promptly notified of the extent of the damage.
The Customer must submit a written report describing any significant damage.
Check the integrity of the documents accompanying the unit and of this manual.
Check for the presence of the wiring diagram.
After starting up the unit, check the commissioning report.

4.2 LOCATION OF SAFETY PLATES

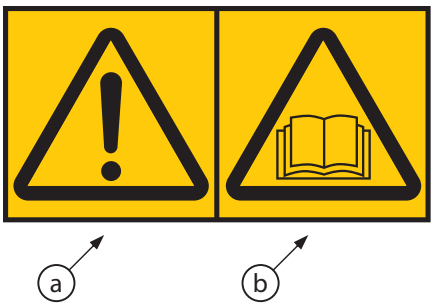




4.2.1 Description of the safety labels

1

a Warning of danger due to the user not being aware of all the functions of the unit and the consequent risks.
b Read the use and maintenance manual carefully before operating the unit.

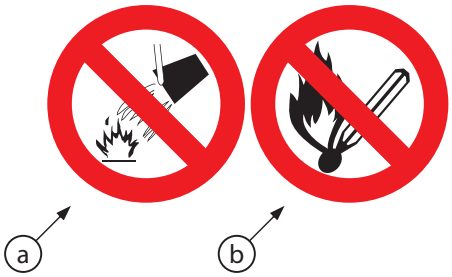


2

Power supply rating plate.

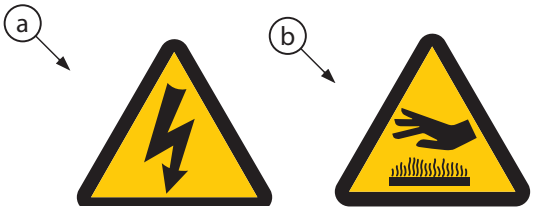
3

a Do not use water to extinguish fire.
b Do not smoke and/or use open flames.



4

a Electric voltage hazard.
b Scalding hazard.



5

Liquid refrigerant.

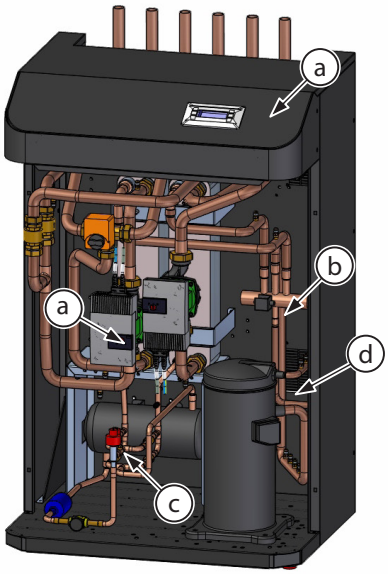
6

Hazard: moving mechanical parts

4.2.2 Residual risk areas

DANGER **It has not been possible to eliminate certain residual risks during the design phase, found in some areas of the unit, or protected with guards due to specific features of the unit.**
Each operator must be aware of the residual risks on this unit in order to prevent potential accidents.

Residual risk areas:
a Risk of short circuit and fire.
b Risk of explosion due to the presence of pressurised circuits.
- Risk of pollution due to the presence of refrigerant in the circuit.
d Risk of burns due to the presence of very hot surfaces.



WARNING **In order to prevent the above-mentioned risks, it is very important to comply with the following:**

a Use the electric panel in compliance with the manufacturer's instructions. Do not place metal objects inside the electric panel. Do not place flammable substances near the unit.
b Do not alter any component of the cooling circuit and do not operate the unit beyond the limits stipulated by the manufacturer.
c Dispose of all the material that compose the unit correctly and use suitable equipment to collect the refrigerant gas (see chap.9).
d Do not touch the internal components without adequate safety devices during operation.

4.3 LIFTING AND TRANSPORT

While the unit is being unloaded and positioned, utmost care must be taken to avoid abrupt or violent manoeuvres. Be very careful when transporting it inside rooms. Do not use the unit components as anchors.

WARNING **During all lifting operations make sure the unit is firmly anchored, to prevent it from tilting or falling.**
Do not move or lift the unit from the removable front panel.

4.4 UNPACKING

The packaging must be carefully removed to prevent damaging the unit. The packaging consists of various materials: wood, cardboard, nylon, etc.
It is recommended to keep them separately and deliver them to suitable waste disposal or recycling facilities in order to minimise their environmental impact.

5 - INSTALLATION

5.1 POSITIONING AND INSTALLATION

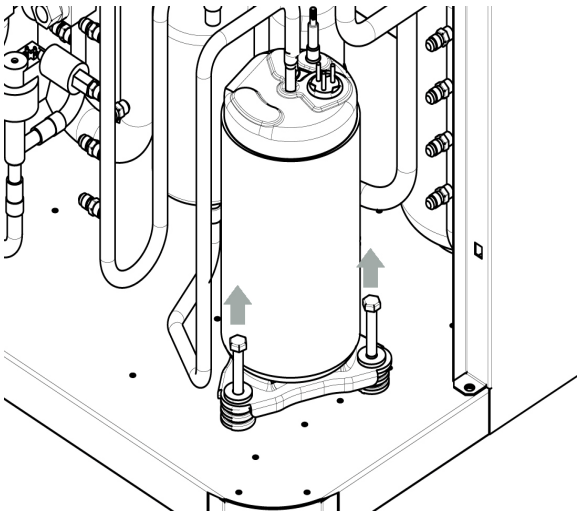
Pay attention to the following aspects when choosing the best place to install the unit and the relative connections:
- size and origin of water pipes;
- location of power supply;
- accessibility for maintenance or repairs;
- solidity of the supporting surface;
- the application limits of the unit:

Maximum (ambient) temperature	°C	42
Minimum (ambient) temperature	°C	-10
Maximum (storage) temperature	°C	42
Minimum (storage) temperature	°C	-20

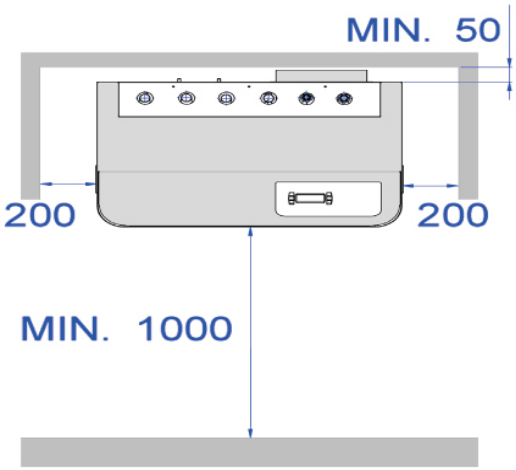
WARNING **The indoor unit has a protection degree of IP22 that does not allow it to be installed outdoors. Make sure the unit is not exposed to much dust and protect it from humidity and salt spray. It is mandatory to use the anti-vibration mounts supplied.**

WARNING **The spaces indicated in the dimensional drawings must be complied with for the units to function properly and routine maintenance to be performed.**

WARNING **ONLY FOR ENX 012 and GSP 012: before starting up the units, open the compressor box and remove the clamping screws of the compressor, which are used to lock it into place during transport.**



WARNING **The spaces indicated in the figure to the side [mm] must be complied with for the units to function properly and routine maintenance to be performed.**



5.2 QUALITY OF THE WATER IN THE SYSTEMS

5.2.1 Water quality

Calcification (solid sediments, especially calcium carbonate) might occur according to the quality of the water, especially in the heat exchanger.
This means that high concentrations of calcium hydrocarbonate can cause calcification.
This is why there is the need to treat a system's heating water (softening/desalination, neutralization, stabilization of the pH).
To fill heating systems, we recommend following the relative standards in force, namely standard VDI-2035.
Also make sure the pH value of the heating water is between 8 and 9.5.

pH	7.5 ÷ 9.0	
SO_4^{--}	< 100	ppm
HCO_3^-/ SO_4^{--}	> 1.0	
Total hardness	4.5 ÷ 8.5	dH
Cl-	< 50	ppm
PO_4^{3-}	< 2.0	ppm
NH3	< 0.5	ppm
Free Chlorine	< 0.5	ppm
Fe^{3+}	< 0.5	ppm
Mn^{++}	< 0.05	ppm
CO_2	< 50	ppm
H_2S	< 50	ppb
Temperature	< 65	°C
Oxygen content	< 0.1	ppm

5.2.2 Water quality on aquifer side (if the circuit is open)

If there is a large amount of solid substances (sand, mud) in the well water, provide for sedimentation tanks to avoid clogging the evaporator (a safety exchanger if necessary).
As for the quality of the groundwater, follow the values below:

pH	6.5 – 9
Chlorides	< 100 mg/kg
Sulphates	< 50 mg/kg
Nitrates	< 100 mg/kg
Manganese	< 0.1 mg/kg*
Free carbon dioxide	< 20 mg/kg
Ammonia	< 2 mg/kg
Iron	< 0.2 mg/kg*
Free chlorides	< 0.5 mg/kg
Electrical conductivity	> 50 mS/cm and < 600 mS/cm
Oxygen	< 2 mg/kg

If these limit values are exceeded, this will result in the siltation of the evaporator and incoming piping and clogging of the injection shaft.

5.3 GENERAL RECOMMENDATION FOR WATER CONNECTIONS

Install the following components on the piping:
- temperature and pressure indicators for routine maintenance and inspections of the unit. Pressure control on the water side allows expansion vessel operation to be checked and any water leaks in the system to be detected in advance.
- sumps on inlet and outlet piping for measuring temperatures, and for directly viewing the operating temperatures. They can also be viewed on the display on board the unit (if pCO).
- shut-off valves (gate valves) to isolate the unit from the water circuit for maintenance.
- **metal mesh filter (incoming pipes), with a mesh not to exceed 1 mm, to protect the exchanger from scales or impurities present in the pipes.**
- air vent valves, placed on the higher parts of the water circuits to bleed the air. [The internal pipes of the unit are fitted with manual air vent valves to bleed the unit: **this operation can only be carried out when the unit is disconnected from the power supply**.]
- discharge cock and, if necessary, drain tank to empty the system for maintenance or seasonal stops.
- For process applications, it is recommended to install a decoupling heat exchanger, which avoids the fouling of the heat exchangers
- **In case of lower temperatures of the outlet water in the evaporator, it's possible to add ethylene/propylene glycol with a percentage by weight not higher than 30%. The effect is a decline of performance, for more information see the table at paragraph 3.2.**

WARNING **It is extremely important that the water inlet is connected at the height of the "Water Inlet" sign.**

If not, the evaporator would be exposed to the risk of freezing, since the anti-freeze thermostat would not be able to perform its function. Furthermore, in the cooling mode, countercurrent circulation would not be activated. Additionally, this position does not enable consent of the water flow control device.
The dimensions and position of the water connections are provided in the dimensional tables and overall drawings.

WARNING **The water circuit must guarantee a constant nominal flow rate of water (+/- 15%) to the evaporator in all operating conditions.**

WARNING **Never perform hydraulic connection operations with open flames near or inside the unit.**

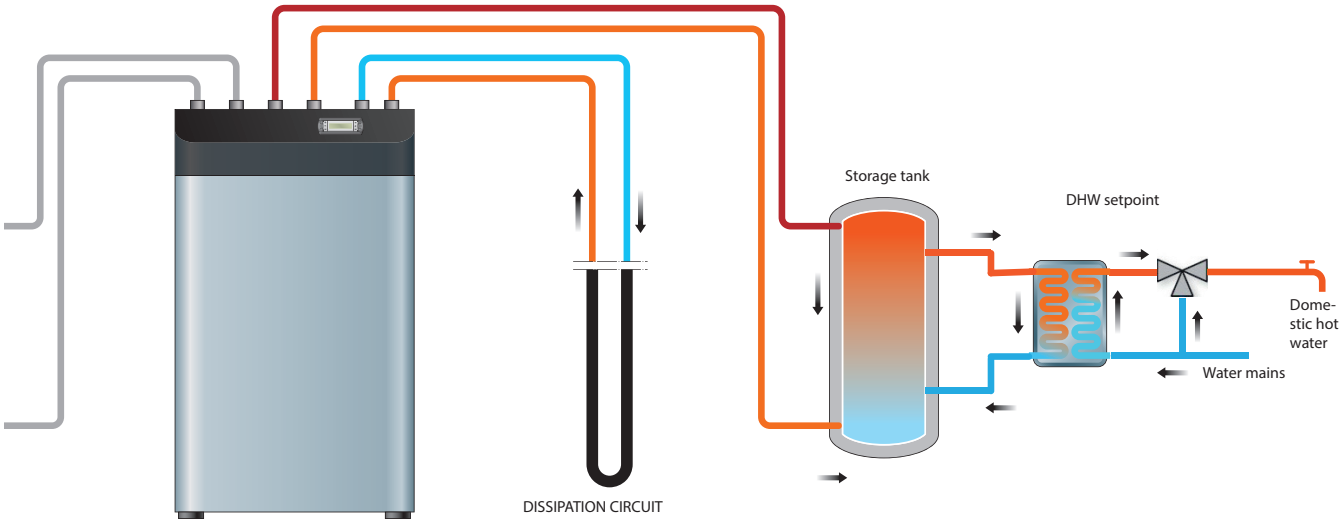
WARNING **For this reason, make sure that the pressure on the pump intake side, where the expansion vessel is positioned, is always above 0.5 Bar with pump running. This helps reduce the risk of cavitation.**

It is extremely important that the installer follows and verifies this procedure step-by-step to prevent the risk of tank implosion or pump cavitation:
- Drain the expansion vessel in the system until the pressure reaches 0.5 bar
- Fill the system and pressurise it to approximately + 1 bar in pump suction (pump stopped)
- Bleed the system
- Check the pump suction pressure (approximately 1 bar) and start up the system
- Stop the pump after 15-30 minutes. Repeat the procedure from step 3 until no more air system noise can be heard.

DRAINING THE SYSTEM
Drain outlets must always be set-up in the lower parts of the system. Drain the unit from the connections on the water pipes beneath the pumps.

5.4 OPTIONAL STORAGE TANKS

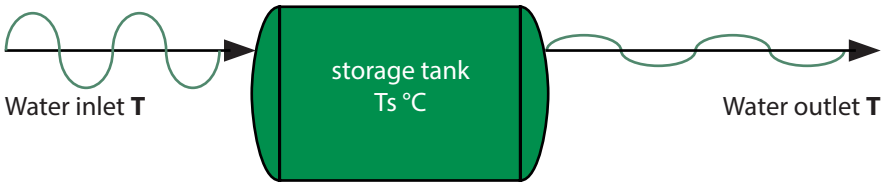
ENX/ENE/GSP/GSE can heat technical water for domestic hot water production. Domestic hot water production always requires a water storage tank (preferably technical) on the circuit used for this function. The storage tank is used to meet demand peaks without installing thermal powers that are too high. This leads to regular and continuous system operation and therefore better thermal performance. The water heated by the unit is stored inside the tank and the energy stored this way allows the tank to be used with an instantaneous preparer. The manufacturer proposes this solution as it allows for good thermal efficiency by heating the water with a thermal approach in countercurrent mode. An electric resistance can also be combined.



In systems containing little water, in which the thermal inertia is low, verify that the water content of the delivery section (to users) satisfies the equation below:

$$V = \frac{Cc \times \Delta\tau}{\rho \times Sh \times \Delta T \times Ns}$$

V = water content in user section [m^3]
Sh = specific heat of the fluid [J/(kg/°C)]
ρ = density of the fluid [kg/m^3]
Δτ = minimum times between 2 start-ups of the compressors [s]
ΔT= permitted difference in water T [°C]
Cc = Cooling capacity [W]
Ns = No. of capacity control steps



WARNING

The units are supplied as standard with a device that controls the water flow rate (differential pressure switch or flow switch) on the hydraulic circuit. Any tampering with this device will immediately invalidate the warranty.
Installing a metal net filter on the water inlet piping.

5.5 SAFETY DEVICES ON THE HIGH PRESSURE SIDE

Cooling circuit safety devices are provided on each refrigerant circuit according to the volumetric capacity of the compressors installed, as prescribed by Directive 97/23 (PED); in particular, with respect to equipment design, this Directive requires manufacturers to abide by the technical standard nearest to the type of object produced; in the case of chillers designed for air-conditioning or liquid cooling systems, standard UNI EN 378-2 is taken into consideration.

6 - ELECTRIC CONNECTIONS

6.1 GENERAL INFORMATION

DANGER **Before carrying out any operation on electrical parts, make sure that the power supply is disconnected.**

Check that the mains electricity supply is compatible with the specifications (voltage, number of phases, frequency) shown on the unit rating plate.
The power connection is made by means of a three-core cable plus neutral and earth cable or single-core cables (one per phase) + earth according to the minimum cross section sizes specified in the wiring diagram, which is an integral part of the documentation accompanying the chiller; the diagram code also appears on the rating plate inside the compressor compartment.

WARNING **The size of the cable and line protections must conform to the specifications provided in the wiring diagram.**

The supply voltage may not undergo fluctuations exceeding ±10% and the unbalance between phases must always be below 2%.

WARNING **The unit must operate within the above values, or the warranty will be invalidated.**

Carry out the electrical connections following the wiring diagram provided with the unit, as well as current regulations.

The electrical connections must be carried out by qualified personnel. All connections must comply with the laws in the country of installation. A suitable disconnecting device must be provided **next to the upstream the indoor unit's electrical power supply**; the electrical inputs specified in this manual and on the data plate shall be taken into consideration for the design of the electrical protections.
Also please note that the outdoor unit's power supply comes from the indoor unit: follow the instructions on the wiring diagram to connect them.
The following table shows the maximum inputs of the indoor unit plus the outdoor unit divided according to the type of fan; the recommended minimum protection can also be found.

6.2 REMOTE CONTROLS

If you intend to launch a remote control on the unit, you must remove the jumper between the contacts indicated in the wiring diagram and connect the remote control to the terminals themselves [see enclosed wiring diagram].

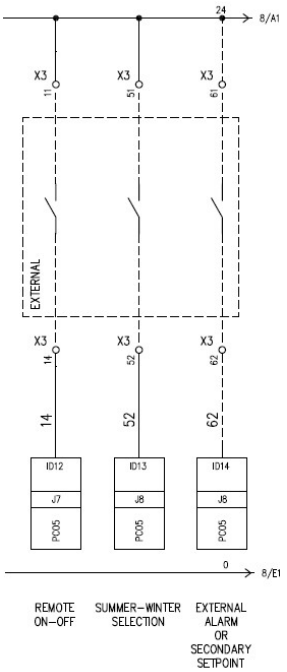
WARNING **All remote controls work with a very low voltage (24 Vac) supplied by the insulating transformer on the electric control board.**

6.3 REMOTE SUMMER-WINTER SWITCHING

If you wish to include a remote control for switching the unit between the summer and winter operating modes, you must remove the jumper between the contacts indicated in the wiring diagram and connect the remote switching control to the terminals themselves [see annexed wiring diagram]. The switching modalities are different according to the type of microprocessor control, i.e. whether it is the basic or advanced type: the detailed instructions are below and in the microprocessor's user manual, an integral part of the documentation supplied.

mChiller (supplied as standard on the ENE model)

pCO (provided as standard for all versions, optional on the ENE model)



The user interface, pCO, consists of an LCD display and 6 keys. It can be used to execute all of the programme operations, show the conditions of the operating unit at any time and change the operating parameters. The functions of the 6 keys of the pCO interface are listed in the following table.

MEANING	ICON	DESCRIPTION
ALARM		Press the ALARM key to access the alarm list. The button lights up when an alarm is triggered.
PROGRAM	Prg	Press the PRG key to access the main menu or to edit a parameter.
ESC	Esc	Press the ESC key to move up one level in the menu.
UP	↑	Press the UP key to go to the next mask or to increase the value of a parameter.
ENTER	↵	Press ENTER to access a parameter to be edited, to confirm editing of a parameter or to select a menu item.
DOWN	↓	Press the DOWN key to go to the previous mask or to decrease the value of a parameter.

WARNING **If an alarm is triggered and the ALARM button (the bell) lights up, do not press the ALARM button to reset the alarm and immediately contact our After Sales Service. For the fill list of alarms, refer to the documentation enclosed with the unit.**

DANGER **All the servicing operations performed on the control equipment must be carried out EXCLUSIVELY BY QUALIFIED PERSONNEL: incorrect calibration values can cause serious damage to the unit and to people.**

7 - START-UP

7.1 PRELIMINARY CHECKS

- Check that all the valves in the cooling circuit are open.
- Check that the electrical connections have been made properly and that all the terminals are securely tightened. This check should also be included in a periodic six-month inspection.
- Check that the voltage at the RST terminals is 400 V ± 10% and make sure the yellow indicator light of the phase sequence relay is on. The phase sequence relay is only fitted on units with a three-phase power supply and is positioned in the middle right part of the electric control board; if the sequence is not duly observed, it will not enable the unit to start.
- Make sure there are no refrigerant leaks that may have been caused by accidental impacts during transport and/or installation.
- Check that the water connections have been properly made according to the indications given on the plates located on the unit itself and the dimensional drawings enclosed with the unit's documentation.
- -Make sure that the water circuit is duly bled to completely eliminate the presence of air: fill the circuit gradually and open the air vent valves on the top part, which the installer should have set in place.
- Check the power supply of the crankcase heating elements, where present.

WARNING **The insertion of the resistors must be made at least 12 hours before, and takes place automatically closing the main switch. They are intended to elevate the T oil sump limiting the amount of refrigerant dissolved in it.**

Water Connections:

- Attention: the unit is loaded with HFC R410A refrigerant – Group II (non-hazardous substances) and in compliance with that prescribed by the EC regulation 2037/00.
- The heat pumps are intended to be integrated into systems, even complex ones, that employ water as a heat transfer fluid. Although all the components used in the hydraulic circuits are designed for this purpose by using suitable materials, we recommend checking the quality of the water used to fill and top up the system to ensure constant performance of the unit over time and avoid unpleasant failures.
- Water connections must be carried out respecting the inlets and outlets as marked on the connections and on the enclosed documentation. Take great care not to reverse the circuits.
- Provide cut-off valves on the water side to be able to intercept the unit respect to the system and insert a net filter (which can be inspected) on each water circuit.
- Load the water circuits and make sure you bleed out all the air inside them via the vents located on the highest points of the pipes and at the top of the tank, if there is one.

Electrical connections:

- WARNING the unit does not have an isolator switch and thermal protection. Provide for suitable protections before connecting the unit to the mains.
- Remove the front panel and the two screws under the instrument panel. Lift the interlocking cover to access the electric panel
- Introduce the power supply cable on the back of the electric panel.
- Connect the power supply and earthing wire to the terminals.
- Power on the equipment via the designated isolator switch
- Activate the automatic switch located on the electric panel
- Close the electric panel and lock it with the screws removed earlier

Start-up:

- Only for ENX012 and GSP012 units: the clamping screws of the compressor must be removed before start-up. If the unit is moved, secure the compressor with the screws again.
- Check that all valves of the water circuits are open and water flows properly (the flow alarm should not be triggered).
- Put the main switch at the ON position.
- The unit is now in standby mode; start it as indicated in the manual

Check the water temperature differential (12-7°C on the utility side in typical summer mode, to be detected by means of a thermometer on the inlet and outlet water pipes of the unit).

- Check the water circuits for leaks.
- Turn off the unit.

Use:

- consult the manuals supplied for all maintenance and/or advanced set-up operations.

WARNING **When setting up the unit respect the legislative regulations of the State where the machine is installed. Responsibility for the correct use is borne by the user.**

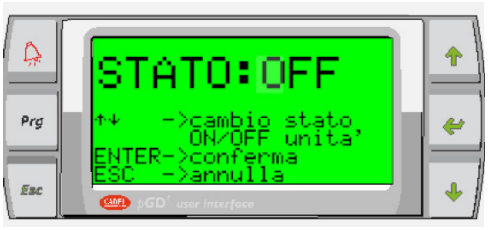
7.2 STARTING THE UNIT

Ad for the commands mask, there can be different configurations based on the type of unit or the settings of the final user. The following table shows the various icons that may be featured, with their relative meaning.

POS.	ICON	DESCRIPTION
1		Main ON-OFF of the unit.
2		Access to information menu (work sizes, device status, software version).
		Selection of utility cold/hot mode (summer/winter).
3		Adjustment of set-points of all utilities (air conditioning/DHW).
		Adjustment of air conditioning system set-point.
4		Access to advanced user/maintenance/manufacturer parameters menu.
		DHW set-point adjustment.

Switching on from local or remote display:

To switch the unit on from the local/remote display, enter the command screen and select the start command , then press ENTER to access the switch-on mask:



Use the UP or DOWN keys to select the new status; press ENTER to confirm the new status or press ESC to exit without changing the status.

The unit will start up if enabled:

- by the safety devices of the water circulation pump/s
- by the flow switch (or differential pressure switch)
- by the T sensor measuring the temperature of the water returning from the system (chiller inlet)
- there are no triggered alarms; if there are, clear the alarm to be able to start-up the unit.

WARNING **If the unit fails to start up, check whether the service thermostat has been set at the rated calibration values.**

Switching on from digital input:
If remote ON-OFF has been enabled from the digital input, the input must be closed (with inverse logic) so that the unit can start (open with direct logic). Refer to the wiring diagram enclosed with the unit to correctly identify the terminals designed for the ON-OFF functions from the digital input.

WARNING **The remote ON/OFF terminals are normally bridged. In this case if you wish to use this function, remove the bridge and place a potential-free contact. The contact draws the 24Vac voltage directly from the unit. The digital input must be configured correctly.**

Switching on from supervisor:
If ON-OFF from the supervisor is among the options selected, then the communication port BMS must be configured and the following values must be written on the variable:

- 0 = unit OFF
- 1 = unit ON

See the list of supervision variables featured in the documentation enclosed with the unit for the address of the specific variable.

WARNING **Before switching ON-OFF from the supervisor, make sure that the communication port has been configured properly, that the bus is wired correctly and with a suitable cable, and that the communication protocols are compatible.**

Switching on from the LAN network Master:
If the unit is inserted in a LAN network between units, the start consent is determined by the Master logics and the final user cannot force starting. In this case the user can only switch the unit off, using the main switch on the local display.

WARNING **You should not disconnect the unit from the power supply during periods when it is idle but only when it is to be taken out of service for a prolonged period (e.g. at the end of the season).**

WARNING **If one or several options among the ones listed in this paragraph have been activated, all the selected sources must provide their consent to switch on the unit.**

7.3 SELECTING THE OPERATING MODES

The active mode of the utility is indicated in the status bar on the main mask. The following table summarises the possible indications:

MEANING	ICON
SUMMER MODE ACTIVE	
WINTER MODE ACTIVE	
DISABLED UTILITY	

In the "DISABLED UTILITY" mode, the unit only produces heat for Domestic Hot Water. In this case, the unit remains in standby if there is no DHW call.

For cooling/heating reversible units, the software offers various ways of selecting the mode, namely:

1) Select from local display
2) Select from remote display
3) Select from digital input
4) Select from supervisor

WARNING **To avoid incompatible mode choices, only one option can be selected.**

WARNING **The "UTILITY DISABLED" function (OFF option from the display) can only be selected from the remote or local display.**

Selection from the local or remote display:

To select the mode from the local display, select the command  from the command panel and press ENTER to access the setting mask of the operating mode.

Use the UP or DOWN keys to select the new status; press ENTER to confirm the new status or press ESC to exit without changing the status.

The selection from the local or remote display allows you also to choose the OFF mode, namely to disable the utility. In this case if the unit is multi-purpose, it will only start for domestic hot water production.

Selection from the digital input:
If the selection has been enabled from the digital input, the input must be closed (with inverse logic) so that the unit can be in summer mode (open with direct logic). In summer mode, the unit sets up to produce cold water, in winter mode, hot water. Refer to the wiring diagram enclosed with the unit to correctly identify the terminals designed for switching from summer to winter mode and vice versa from the digital input.

WARNING **The terminals for mode selection are normally bridged. In this case if you wish to use this function, remove the bridge and place a potential-free contact. The contact draws the 24Vac voltage directly from the unit. The digital input must be configured correctly.**

Selection from supervisor:
If the mode has been selected from the supervisor, then the communication port BMS must be configured and the following values written on the variable:

- 0 = summer mode
- 1 = winter mode

See the list of supervision variables featured in the documentation enclosed with the unit for the address of the specific variable.

WARNING **Before using the mode, make sure that the communication port has been configured properly, that the bus is wired correctly and with a suitable cable, and that the communication protocols are compatible.**

7.4 SETTING THE SET-POINTS

To modify the operating set-point, select one of the following icons from the command menu based on the active configurations and press ENTER:

- to change the air-conditioning utility set-point
- to change the domestic hot water set-point (DHW)
- to change utility and DHW set-points

Once you have entered the setting mask:

1) Use the UP key to increase the set-point
2) Use the DOWN to decrease the set-point
3) Press ENTER to confirm the new value
4) Press ESC to exit without changing the set-point

WARNING **For supplementary functions to be applied to the set-point, see the specific paragraph of the microprocessor enclosed with the unit's documentation.**

7.5 CHECKS DURING OPERATION

- Check the relay on the control board to verify whether the phases occur in the correct sequence: if they do not, disconnect the unit from power supply and reverse two phases of the three-core cable at the unit input. Never attempt to modify internal electrical connections: any undue modifications will render the warranty null and void.

- Check that the temperature of the water entering the evaporator is close to the service thermostat set value.

- After a few hours of operation, check that the liquid indicator light has a green ring: yellow indicates the presence of humidity in the circuit. In such a case the circuit must be dehumidified by qualified personnel.

- Large quantities of bubbles should not appear through the liquid level indicator. A constant passage of numerous bubbles may indicate that the refrigerant level is low and needs to be topped up. The presence of a few bubbles is however allowed, especially in the case of high-glide ternary mixtures such as HFC R410A.

- Also check that the end-of-evaporation temperature shown on the pressure gauge (refer to the pressure gauge scale for the refrigerant R410A) is about 4 below the temperature of the water leaving the evaporator.

- Make sure the superheating of the refrigerant fluid is limited to between 5 and 8 °C. To do this:
  1) read the temperature indicated by a contact thermometer placed on the compressor intake pipe;

2) read the temperature indicated on the scale of a pressure gauge likewise connected to the intake side; refer to the pressure gauge scale for the refrigerant R410A.

The degree of superheating is given by the difference between the temperatures thus determined.

- Make sure that the subcooling of the refrigerant fluid is limited to between 3 and 5°C. To do this:
  1) read the temperature indicated by a contact thermometer placed on the condenser outlet pipe;
  2) read the temperature indicated on the scale of a pressure gauge connected to the liquid inlet at the condenser outlet; refer to the pressure gauge scale for the refrigerant R410A.

The degree of subcooling is given by the difference between the temperatures thus determined.

WARNING **All the units of the series are loaded with R410A refrigerant. Any top-ups must be made using the same type of refrigerant and are part of the extraordinary maintainers conducted by qualified personnel.**

WARNING **the R410A refrigerant requires “POE” polyolester oil of the type and viscosity indicated on the compressor data plate. For no reason should a different type of oil be introduced into the oil circuit.**

7.6 STOPPING THE UNIT

The unit can be stopped by pressing the "OFF" control on the front panel of the display on the switch-on mask.

WARNING **To stop the unit do not disconnect it using the main switch: this device must only be used to disconnect the unit from the power supply without current flow, i.e. when the unit is switched OFF.**

8 - MAINTENANCE AND PERIODIC CHECKS

Operating these units reduces itself to turning them on and off and to seasonal changeover between cooling and heating. All other operations are part of maintenance and must be carried out by qualified personnel capable of working in compliance with laws and standards in force.

8.1 WARNINGS

WARNING **All the operations described in this chapter MUST ALWAYS BE PERFORMED BY QUALIFIED PERSONNEL**

WARNING **Before carrying out any work on the unit or accessing internal parts, make sure you have disconnected it from the mains electricity supply.**

WARNING **The top part and the supply piping of the compressor are at high temperatures. Be especially careful when working close by with open panelling.**

WARNING **After completing maintenance jobs, always replace the panels enclosing the units and secure them with the fastening screws provided.**

8.2 MAINTENANCE TABLE

To make sure performance remains constant in time, it is recommended to respect the following maintenance and control schedule.

Activity	Frequency
Check the efficiency of all the control and safety devices.	Yearly
Check the terminals on the electric control board and compressor terminal boards to ensure that they are securely tightened. The movable and fixed contacts of the contactors must be periodically cleaned and replaced whenever they show signs of deterioration.	Yearly
Check the refrigerant level by means of the liquid level indicator.	Yearly
Check the oil levels through the indicators provided on the compressor crankcases.	Yearly
Check the water circuit for leaks.	Every 6 months
If the unit is to remain inactive for a long period of time, discharge the water from the piping and from the heat exchanger. This operation is of the utmost importance especially when there are periods while the unit is idle in which the temperature drops below the freezing point of the fluids used.	Yearly
Check that the water circuit is full.	Every 6 months
Check the efficiency of the flow switch or differential pressure switch.	Yearly
Clean the metal mesh filters mounted externally on the water pipes.	Every 6 months
Check the humidity indicator on the liquid level indicator (green=dry, yellow=humid); if the indicator is not green as shown on the indicator sticker, replace the filter.	Yearly

8.3 REPAIRING THE COOLING CIRCUIT

WARNING **While performing repairs on the cooling circuit or maintenance work on the compressors, make sure the circuit is left open for as little time as possible. Even if briefly exposed to air, ester oils tend to absorb large amounts of humidity, which results in the formation of weak acids.**

If the cooling circuit has undergone any repairs, the following operations must be carried out:
-seal test;
-emptying and drying of the cooling circuit;
-refrigerant load.

WARNING **If the system has to be drained, always recover the refrigerant present in the circuit using suitable equipment; the refrigerant should be handled exclusively in the liquid phase.**

8.4 SEAL TEST

Fill the circuit with anhydrous nitrogen supplied from a tank with a pressure-reducing valve until the pressure rises to 10 bar.

WARNING **During the pressurisation phase, do not exceed the pressure setting of the safety valves; otherwise you will cause the latter to open.**

The presence of any leaks must be determined using special leak detectors. Should any leaks be detected during the test, empty out the circuit before repairing the leaks with suitable alloys.

DANGER **Do not use oxygen in the place of nitrogen as a test agent, since this could cause a risk of explosion as well as the certainty of extensive oxidisation in high-temperature areas.**

9 - DECOMMISSIONING THE UNIT

When the unit has reached the end of its working life and must be removed and replaced, a number of measures must be followed:
- the refrigerant gas it contains should be recovered by specialised personnel and sent to a waste collection facility;
- the lubricating oil in the compressors should also be recovered and sent to a waste collection facility;
- if the framework and components cannot be reused, they must be separated and scrapped according to the type of material: this applies especially for the considerable quantities of copper and aluminium present in the unit.

This will facilitate the work carried out in the waste collection, disposal and recycling facilities and minimise the environmental impact of such processes.

WARNING
- **Should the unit, or a part of it, be decommissioned, the parts liable to cause any hazard must be rendered harmless.**

Remember that whenever a part is replaced and the used part must be disposed of separately, always refer to the relative laws in force.

Please note it is mandatory to register the loading and unloading of special and toxic-harmful waste.
Special and toxic-harmful waste must be collected by authorised companies.
Special and toxic-harmful waste must be disposed of in compliance with the applicable laws in the user's country.
Dismantle the unit according to the requirements imposed by law in force in the user's country. Before demolishing the unit, ask the relative Authority to perform an inspection and issue a report.
Lastly, scrap the unit in compliance with the applicable laws in the user's country.

WARNING **Qualified personnel must dismantle and demolish the unit.**

TROUBLESHOOTING

10.1 UNIT ALARM

WARNING **IF AN ALARM IS TRIGGERED AND THE ALARM BUTTON (THE BELL) LIGHTS UP, DO NOT PRESS THE ALARM BUTTON TO RESET THE ALARM AND IMMEDIATELY CONTACT OUR AFTER SALES SERVICE. FOR THE FILL LIST OF ALARMS, REFER TO THE DOCUMENTATION ENCLOSED WITH THE UNIT.**

ALARM KEY

10.2 TROUBLESHOOTING

The most common causes that can block the heat pump or cause a malfunction are listed in the following pages. They are listed according to the easily identifiable symptoms.

WARNING **Be very careful when carrying out the various recommended problem-solving operations: overconfidence can cause serious injuries for unskilled persons. It is therefore recommended to contact the manufacturer or a qualified technician after having identified the cause.**

FAULT	ANALYSIS OF POSSIBLE CAUSES	CORRECTIVE ACTIONS
The unit does not start	No electrical power supply.	Check its presence both on the primary and auxiliary circuit.
	The circuit board is not powered.	Check the fuses.
	There are alarms present.	Check the microprocessor panel for the presence of alarms, eliminate their cause and restart the unit.
Faulty high pressure	Air in the circuit, detected by air bubbles on the flow indicator and sub-cooling values reaching over 5°C.	Drain and pressurise the circuit and then verify whether there are any leaks. Drain the circuit slowly [more than 3 hours] up to 15 Pa and then recharge in the liquid phase.
	Unit too loaded detectable by sub-cooling greater than 8 °C.	Discharge circuit.
	Clogged thermostatic valve and / or filter. Such faults may occur in the presence of low pressure.	Check the temperature upstream and downstream the valve and filter and have them replaced, if necessary.
	Insufficient water flow rate if heat pump is operating.	Check the pressure drops of the water circuit and/or the correct operation of the pump [rotation direction]. Check the outlet water T and make sure it is 50°C or less.
Low condensation pressure	Faulty transducers.	Check the transducers and the correct operating of the depressor on the Schrader valves to which they are connected.
	Low water temperature if heat pump is operating.	Make sure the thermal load is adequate for the power of the unit.

FAULT	ANALYSIS OF POSSIBLE CAUSES	CORRECTIVE ACTIONS
Low evaporation pressure	Low water flow rate.	Check the correct rotation of the pumps. Check for load losses on the hydraulic circuit. Check the tightness of the one-way valve of the pump unit (optional).
	Malfunctioning of thermostat valve.	Check its opening, and adjust if necessary, by heating the bulb by hand. If there is no response, replace it.
	Clogged filter.	Pressure drops through the filter must not exceed 2°C (saturation temperature). Should it happen, replace the filters.
	Low condensation temperature.	Make sure the condensation control works properly [if present].
	Low refrigerant load.	Check the charge by measuring the sub-cooling; if it is below 2°C, charge with refrigerant.
The compressor does not start	Internal thermal protector tripped.	Check the status of the thermal contact in models equipped with protection modules. Identify the causes after restarting.
	Tripping of circuit breakers or fuses in line after short circuit.	Check the cause by measuring the resistance of the individual coils and the isolation towards the chassis before re-connecting the power.
	Intervention of HP or LP switches.	Check the microprocessor, eliminate the causes.
	The phases in the distribution cabin have been inverted.	Check the phase sequence relay.

11 - R410A REFRIGERANT SAFETY DATA SHEET

COMPOSITION/INFORMATION REGARDING THE INGREDIENTS	
CHEMICAL NATURE OF THE PRODUCT	MIXTURE OF: FORANE 32 (DIFLUOROMETHANE): CAS: 75-10-5 EINECS: 200-839-4 F+ R_12 FORANE 125 (PENTAFLUOROETHANE) CAS: 354-33-6 EINECS: 206-557-8
EINECS	Compliant
IDENTIFICATION OF RISKS	
MAJOR RISKS	-
PHYSICAL AND CHEMICAL RISKS:	Thermal decomposition in toxic and corrosive products
SPECIFIC / EC RISKS:	Preparation is not classified as dangerous
FIRST AID	
GENERAL INFORMATION	-
INHALATION	Move the person in question to fresh air If necessary, provide oxygen or artificial respiration
CONTACT WITH SKIN:	Rinse with plenty of water Frostbite must be treated as thermal burns
CONTACT WITH THE EYES	Rinse immediately, with plenty of water and for a long time If the irritation persists, consult an ophthalmologist
SWALLOWED	Hospitalization
PROTECTION OF RESCUERS	Wear suitable respiratory equipment when intervening in a saturated atmosphere
INSTRUCTIONS FOR THE DOCTOR	Do not administer catecholamines (due to the cardiac sensitization caused by the product)
FIRE PREVENTION	
SPECIFIC HAZARDS	Thermal decomposition in toxic and corrosive products Hydrofluoric acid Carbon oxides One of the ingredients of this preparation forms explosive mixtures with air. (FORANE 32)
SPECIFIC METHODS OF INTERVENTION:	Cool the containers / tanks with jets of water. Prohibit all sources of sparks and ignition - Do not smoke
SPECIAL PROTECTION SYSTEMS FOR FIRST AID SQUADS:	Wear breathing apparatus and protective clothing
MEASURES IN CASE OF ACCIDENTAL DISPERSION	
PERSONAL PRECAUTIONS	Avoid contact with your skin, eyes and inhalation of vapours Use personal protective equipment In a closed place: ventilate the area or use breathing apparatus (risk of anoxia) No smoking
ENVIRONMENTAL PROTECTION PRECAUTIONS	Minimise waste in the environment
HANDLING AND STORAGE	
Technical Measures/Precautions	Applicable product storage and handling provisions: PRESSURISED LIQUEFIED GAS Provide ventilation and an appropriate exhaust system in line with the equipment
Recommendations for use	Prohibit sources of ignition and contact with hot surfaces. DO NOT SMOKE
Technical measures/Storage methods	Store in the original container at room temperature Keep away from open flames, hot surfaces and sources of ignition Store in a cool and well ventilated area Protect the full containers from sources of heat in order to prevent overpressure
Recommendations	Ordinary steel
To be avoided	Alloy containing more than 2% magnesium Plastic materials
PERSONAL EXPOSURE PROTECTION/CONTROL	
PRECAUTIONS TO BE TAKEN	Make sure there is enough air recirculation and/or intake in the workplace
CONTROL PARAMETERS	-
Exposure limit values	FORANE 32: USA-AIHA 2001: WEEL (8 h) = 1000 ppm (4910 mg/m^3) ARKEMA recommended limit value: VME = 1000 ppm (2130 mg/m^3) FORANE 125: ARKEMA recommended limit value: VLE = 1000 ppm (4900 mg/m^3)
PERSONAL EXPOSURE PROTECTION/CONTROL	
PERSONAL PROTECTIVE EQUIPMENT	-
Respiratory protection	Wear suitable respiratory equipment in case of insufficient ventilation
Hand protection	Gloves
Eye protection	Safety goggles

PHYSICAL AND CHEMICAL PROPERTIES	
PHYSICAL STATE (20°C)	Liquefied gas
COLOUR	Colourless
ODOUR	Slightly similar to ether
pH	Not applicable
BOILING POINT	-52.6 °C
FLAMMABILITY POINT	It does not ignite under test conditions
VAPOUR PRESSURE	(25 °C): 1.68 MPa (16.8 bar) (50 °C): 3.11 MPa (31.1 bar) (65 °C): 4.31 MPa (43.1 bar)
VAPOUR DENSITY	(25 °C): 3.0 kg/m^3 (1013 hPa (mbar))
DENSITY	(25 °C): 1063 kg/m^3 (50 °C): 912 kg/m^3
PARTITION COEFFICIENT (n-octanol/water)	Forane 32: log Pow = 0.21 (measured) - Forane 125: log Pow = 1.48 (measured)
OTHER DATA	Solubility of water in the product at 25°C : 0.045% in mass Henry's constant: Forane 32: 0.296.E5 Pa m3/mol. Forane 125: 3.09.E5 Pa m3/mol. Critical temperature: Tc= 71°C Critical pressure: Pc= 4.9 MPa (49 bar)
STABILITY AND REACTIVITY	
CONDITIONS TO BE AVOIDED	Avoid contact with flames and red-hot metal surfaces
HAZARDOUS DECOMPOSITION PRODUCTS	Thermal decomposition in toxic fluorinated products Hydrogen fluoride (hydrofluoric acid) Carbon oxides
ADDITIONAL INFORMATION	The product is stable under normal conditions of storage and handling
TOXICOLOGICAL INFORMATION	
ACUTE TOXICITY	-
Inhalation	Inhalation of high concentrations of vapour may cause the following : Headache, drowsiness and dizziness As with other volatile halogenated aliphatic components, the product can cause the following due to vapour accumulation and/or inhalation of large quantities : Loss of consciousness and cardiac disorders aggravated by stress and lack of oxygen: life threatening Experimental in animals: (studies on the constituents of the product) Practically not harmful if inhaled No death occurred in rats given 500 000 ppm / 4h
LOCAL EFFECTS	-
Contact with skin	Possible frostbite due to splashes of liquefied gas
Contact with the eyes	Possible frostbite due to splashes of liquefied gas
CHRONIC TOXICITY	(studies on the constituents of the product) No toxic or chronic effect (*) has been revealed by studies on prolonged inhalation in animals (rat /3 months : 50 000 ppm)
SPECIFIC EFFECTS	GENOTOXICITY: (studies on the constituents of the product) According to experimental data available: Not genotoxic TOXICITY FOR REPRODUCTION: Foetal development: (studies on the constituents of the product) According to experimental data available: Absence of toxic effects on foetal development Non toxic concentrations for the mothers (rat, rabbit/inhalation)
ECOLOGICAL INFORMATION	
	Due to its composition: Not easily biodegradable - Not bioaccumulative
SUBSTANCE	FORANE 32
Persistence/degradability	-
In water	Not easily biodegradable: 5% after 28d (OECD Guideline 301 D)
In air	Degradation by OH radicals: t½ life = 1472 d Ozone depletion potential: ODP (R-11 = 1) = 0 Greenhouse potential of halogenated hydrocarbons : HGWP (R-11 = 1) = 0.13
Bioaccumulation	Practically not bioaccumulative: log Pow = 0.21 (OECD Guideline 107)

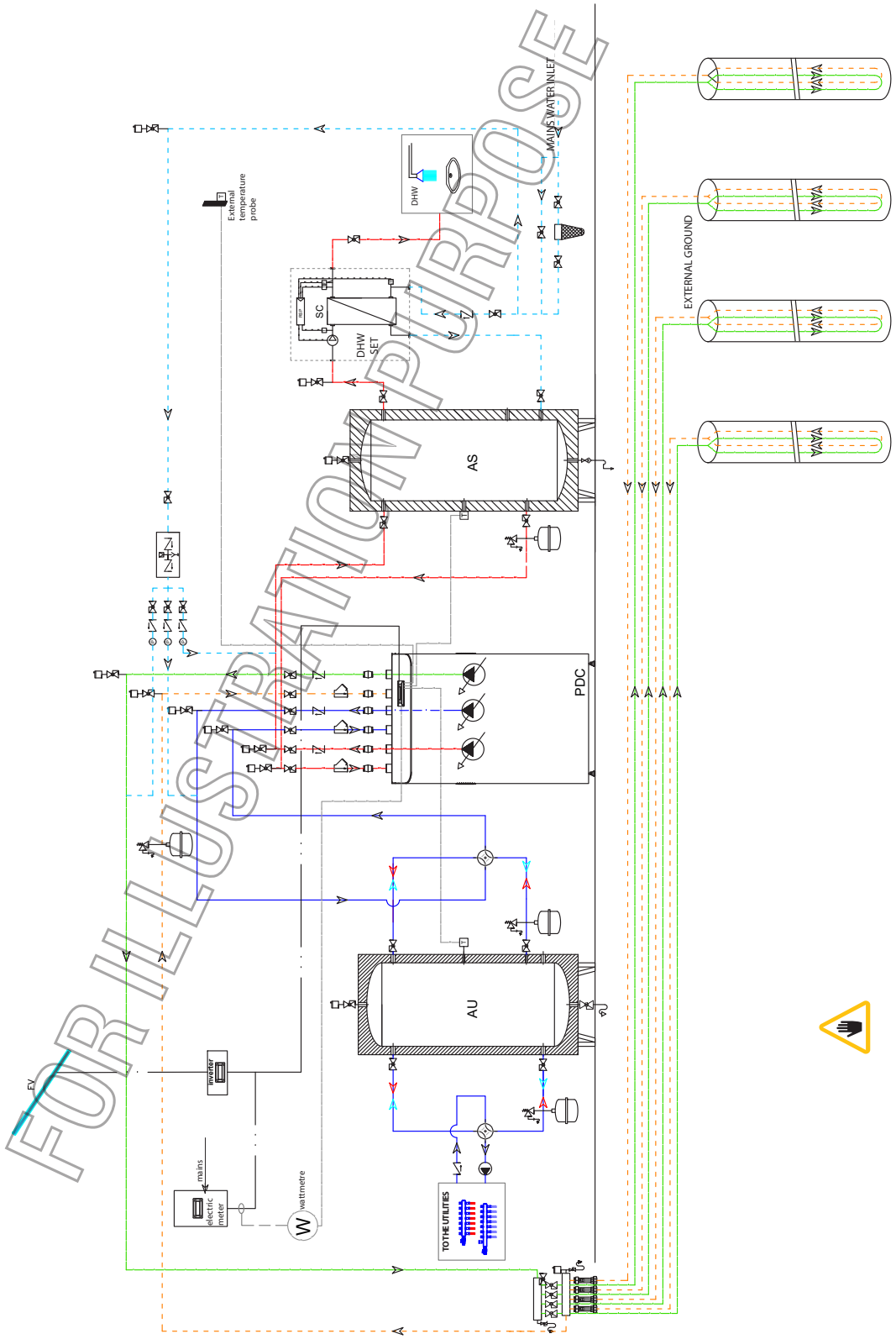
ECOLOGICAL INFORMATION	
	Due to its composition: Not easily biodegradable - Not bioaccumulative
SUBSTANCE	FORANE 125
Mobility	In an aqueous environment: Fast evaporation: t½ life = 3.2 h (estimate) In soils and sediments: Weak absorption: log Koc = 1.3 - 1.7
Persistence/degradability	-
In water	Not easily biodegradable - 5% after 28d (OECD Guideline 301 D)
In air	Degradation in the troposphere: t½ life = 28.3y (estimate) Ozone depletion potential: ODP (R-11 = 1) = 0 Greenhouse potential of halogenated hydrocarbons : HGWP (R-11 = 1) = 0.83
Bioaccumulation	Practically not bioaccumulative log Pow = 1.48 : (measured)
DISPOSAL CONSIDERATIONS	
ELIMINATING THE PRODUCT	Recycle or incinerate
INFORMATION REGARDING TRANSPORT	
Technical shipping name	Refer to section : 2
RID/ADR	ONU No. : 3163 Hazard identification number: 20 Class: 2 Packaging group: - Classification code: 2A Labels: 2.2
ADN/ADNR	Substance identification number: 3163 Hazard identification number: 20 Class: 2 Number (and letter): 2°A Labels: 2
IMDG	ONU No. (IMDG): 3163 Class: 2.2 Subsidiary risks: - Packaging group: - Labels: 2.2 Marine Pollutant (MP): NO
IATA	ONU No. (IATA) or ID No.: 3163 Class: 2.2 Subsidiary risks: - Packaging group: - Labels: 2.2 Refer to ARKEMA's safety services for further information and updates
REGULATORY INFORMATION	
EEC DIRECTIVE	-
SAFETY DATA SHEETS	D. 91/155/EEC amended by D. 93/112/EEC and D. 2001/58/EC: Dangerous substances and preparations
EC LABELLING / CLASSIFICATION	-
DANGEROUS PREPARATIONS	D. 1999/45/EC amended by D. 2001/60/EC Not classified as dangerous
SUBSTANCES THAT DEPLETE THE OZONE LAYER	EC Regulation No. 2037/2000 amended by EC Regulation No. 1804/2003
INVENTORIES	EINECS: compliant TSCA (USA): compliant ENCS (Japan): compliant ECL (Korea): compliant PICCS (Philippines): compliant
FURTHER INFORMATION	
LIST OF RELEVANT R-PHRASES	R12 _ Extremely flammable
BIBLIOGRAPHIC REFERENCES	Encyclopédie des gaz (Air Liquide - Ed.1976 - ELSEVIER AMSTERDAM)

Fill in the following table to keep track of the maintenance work conducted:

DATE OF FIRST START-UP ___/___/_____	YEAR												
	SIX-MONTH PERIOD	1°	2°	1°	2°	1°	2°	1°	2°	1°	2°	1°	2°
Check the efficiency of all the control and safety devices.													
Check the terminals on the electric control board and compressor terminal boards to ensure that they are securely tightened. The movable and fixed contacts of the contactors must be periodically cleaned and replaced whenever they show signs of deterioration.													
Check the refrigerant level by means of the liquid level indicator.													
Check the oil levels through the indicators provided on the compressor crankcases.													
Check the water circuit for leaks.													
If the unit is to remain inactive for a long period of time, discharge the water from the piping and from the heat exchanger. This operation is of the utmost importance especially when there are periods while the unit is idle in which the temperature drops below the freezing point of the fluids used.													
Check that the water circuit is full.													
Check the efficiency of the flow switch or differential pressure switch.													
Clean the metal mesh filters mounted externally on the water pipes.													
Check the humidity indicator on the liquid level indicator (green=dry, yellow=humid); if the indicator is not green as shown on the indicator sticker, replace the filter.													

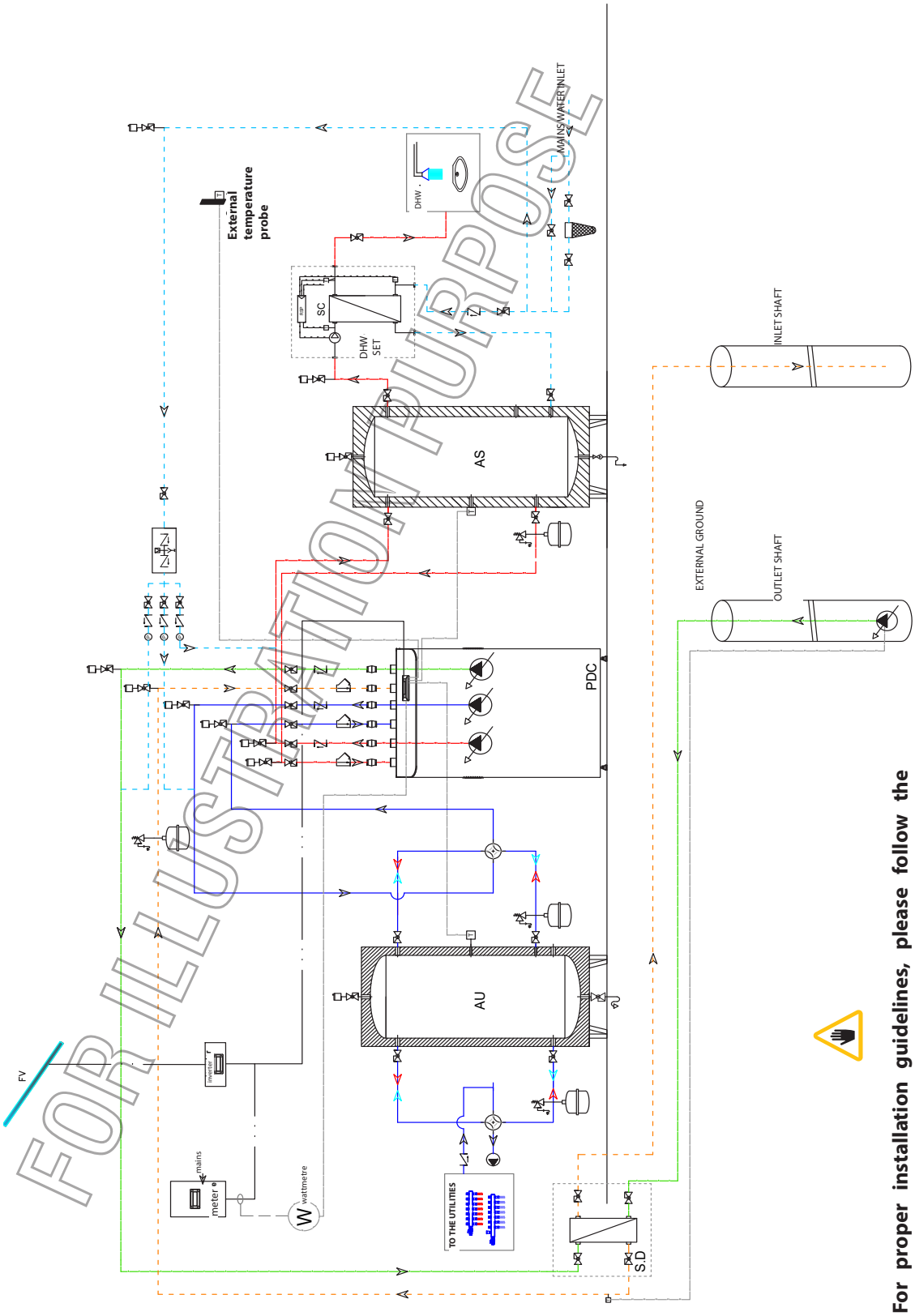
12 - SYSTEM DIAGRAMS

Hydraulic connection diagram for heating, cooling and producing domestic hot water with a single heat pump and system on the source side with geothermal probes. Accessories in place: external air temperature probe, 4-way valves to reverse the connections on the utility tank on a seasonal basis and kit to use the power produced (ENX and GSP only).



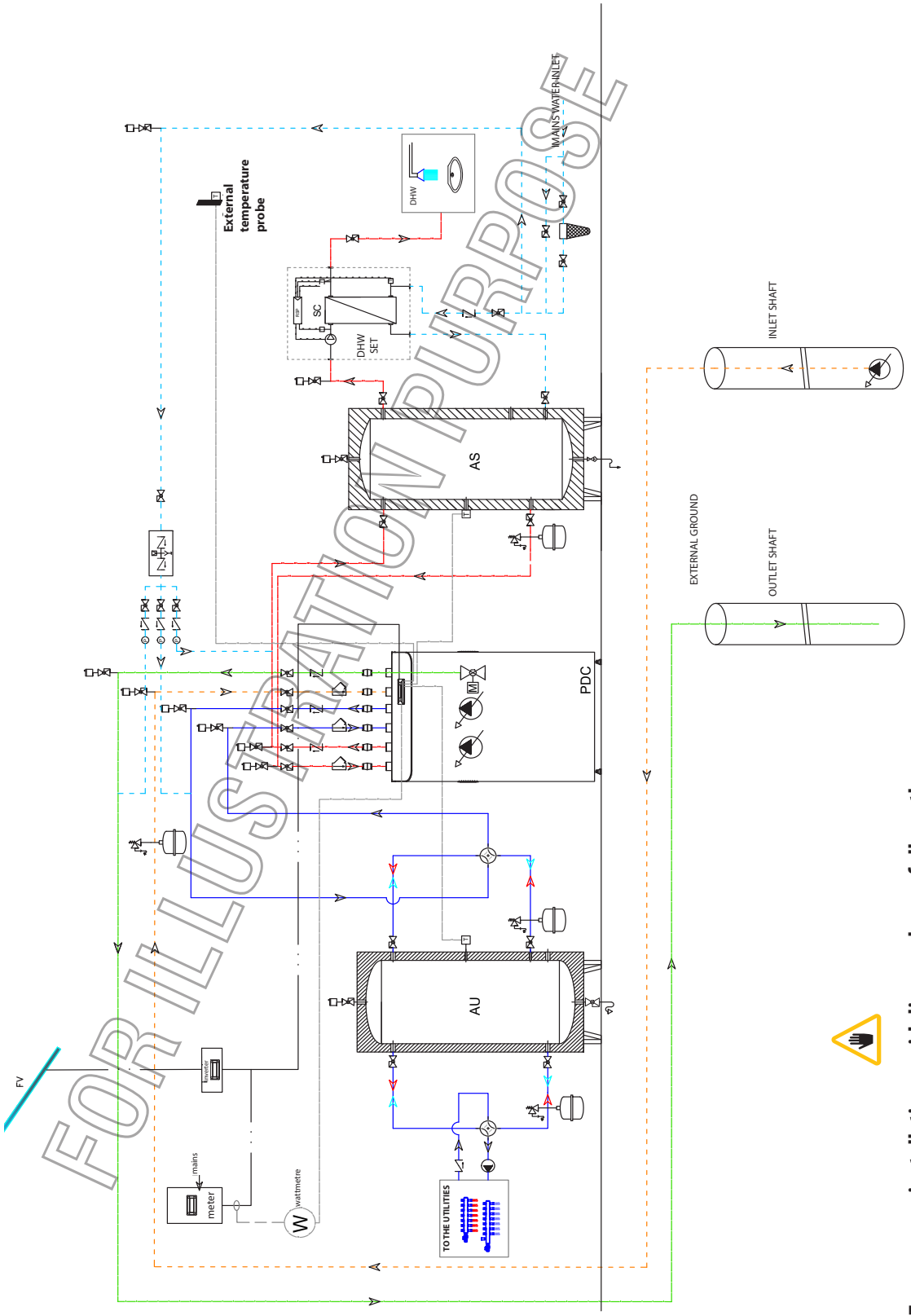
For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.

Hydraulic connection diagram for heating, cooling and producing domestic hot water with a single heat pump and system on the source side with groundwater and decoupling heat exchanger. Accessories in place: external air temperature probe, 4-way valves to reverse the connections on the utility tank on a seasonal basis and kit to use the power produced (ENX and GSP only).



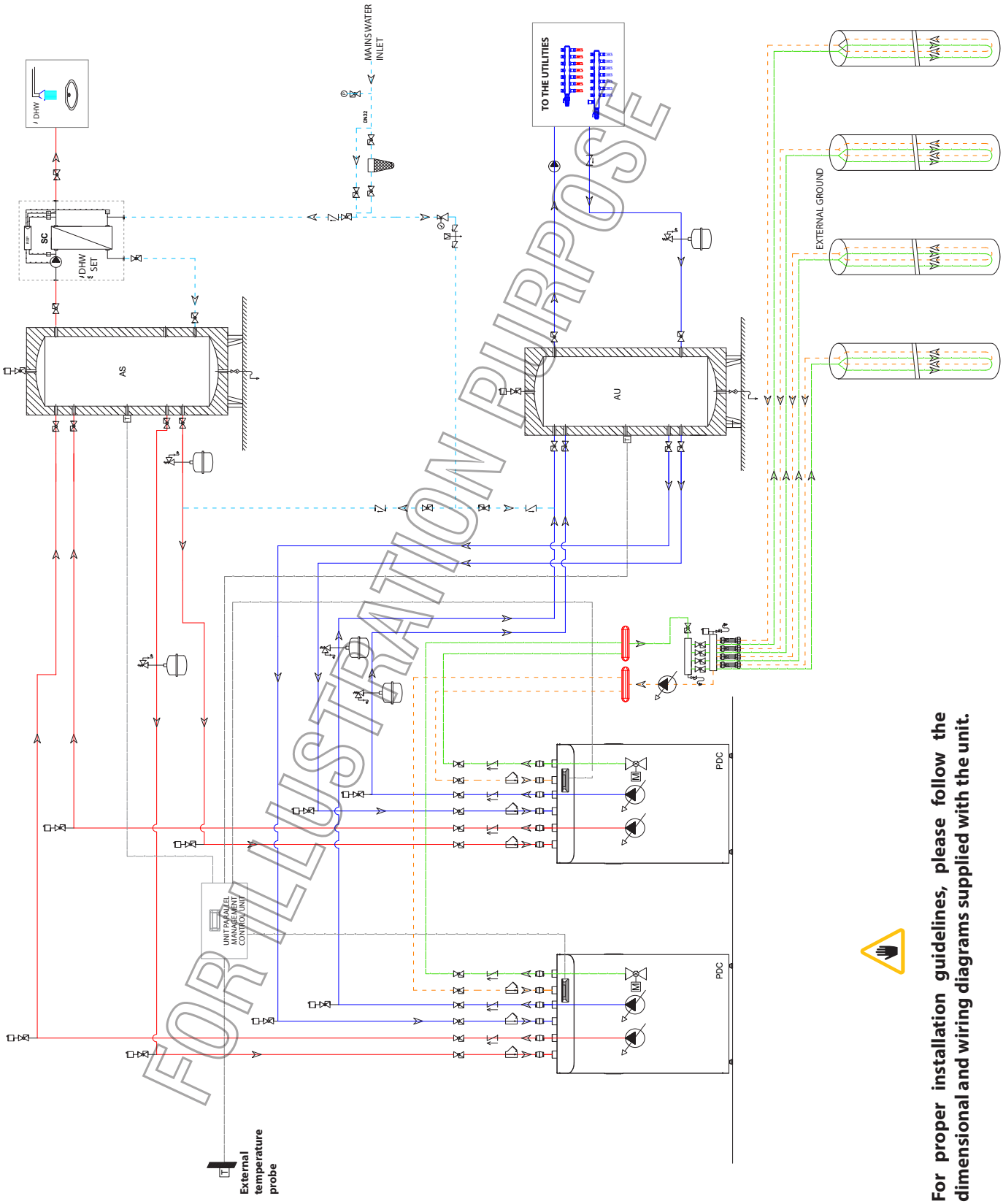
For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.

Hydraulic connection diagram for heating, cooling and producing domestic hot water with a single heat pump and system on the source side with groundwater without decoupling heat exchanger. Accessories in place: external air temperature probe, 4-way valves to reverse the connections on the utility tank on a seasonal basis and kit to use the power produced (ENX and GSP only).



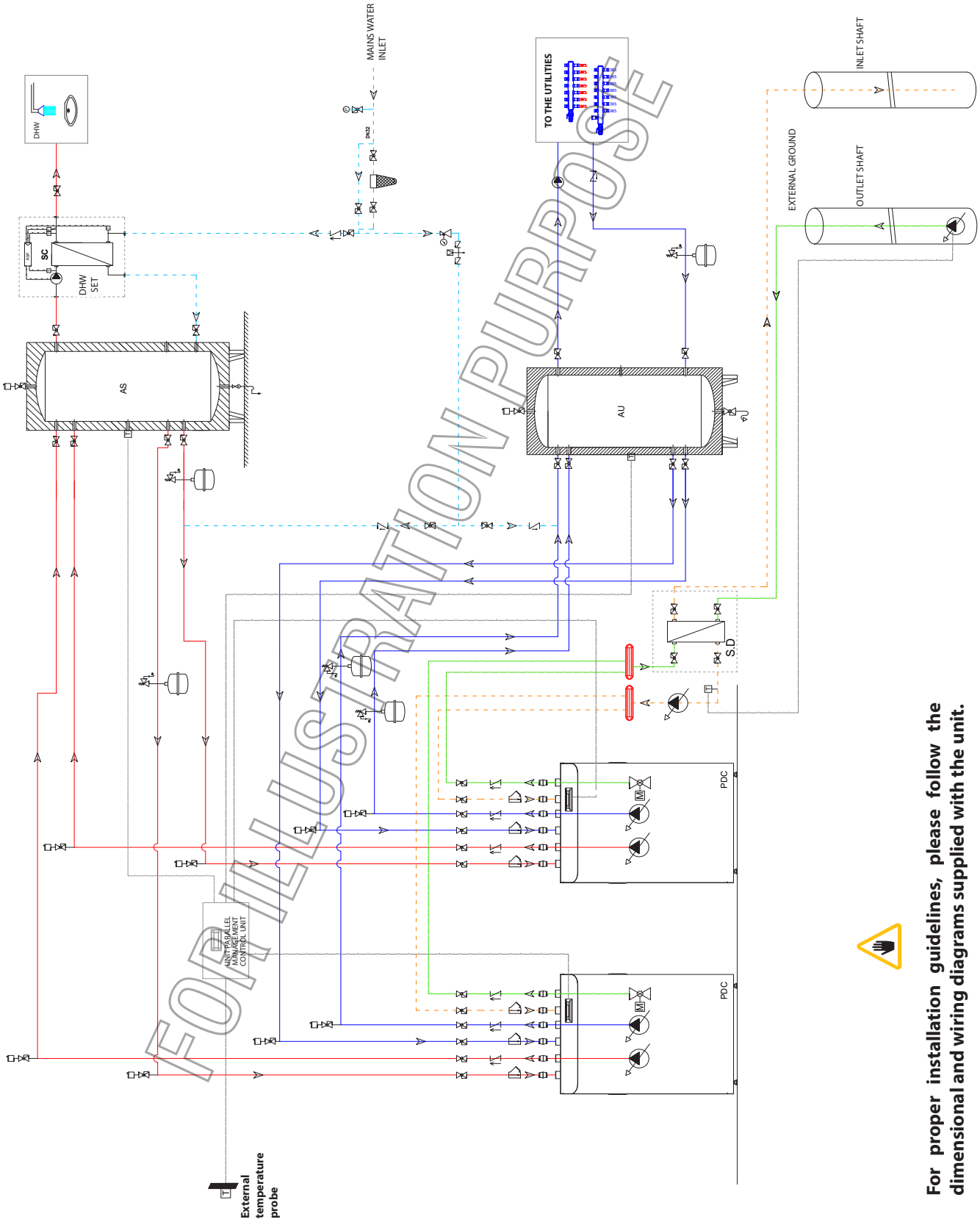
For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.

Hydraulic connection diagram for heating, cooling and producing domestic hot water with two heat pumps managed in parallel mode with a dedicated control panel and system on the source side with geothermal probes. Accessories in place: outdoor air temperature probe.



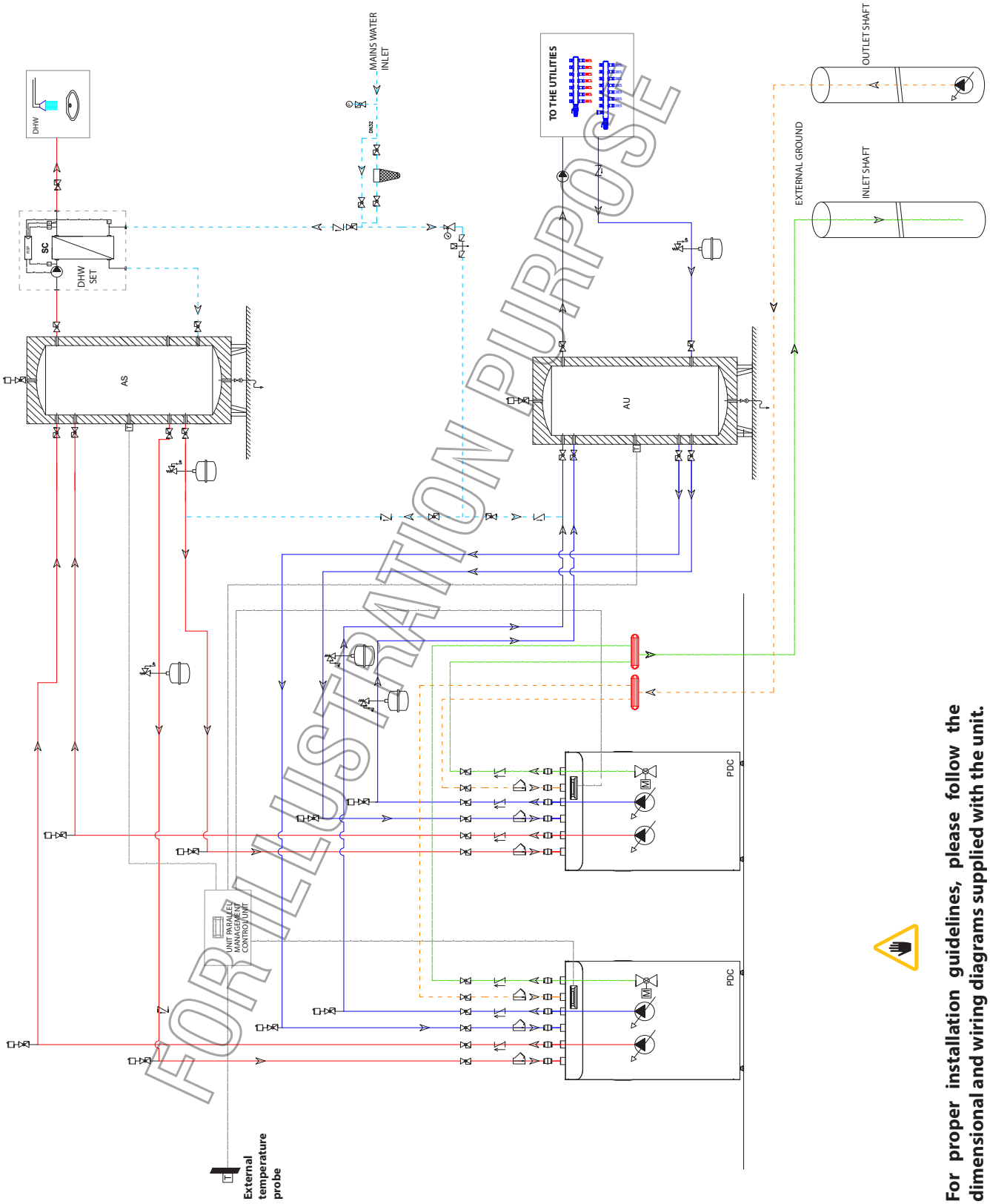
For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.

Hydraulic connection diagram for heating, cooling and producing domestic hot water with two heat pumps managed in parallel mode with a dedicated control panel and system on the source side with groundwater and decoupling heat exchanger. Accessories in place: outdoor air temperature probe.



For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.

Hydraulic connection diagram for heating, cooling and producing domestic hot water with two heat pumps managed in parallel mode with a dedicated control panel and system on the source side with groundwater without decoupling heat exchanger. Accessories in place: outdoor air temperature probe.



For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.

KEY TO SYMBOLS

- MEMBRANE EXPANSION VESSEL
- PUMP
- ELECTRONIC PUMP
- WATTMETER
- SAFETY VALVE
- BALL VALVE
- 4-WAY VALVE
- CHECK VALVE
- Y-SHAPED FILTER
- VIBRATION DAMPER JOINT
- DISCHARGE VALVE
- MICROMETRIC MESH FILTER
- UNIT PARALLEL MANAGEMENT CONTROL UNIT (centralina gestione unità in parallelo)
- 2-WAY VALVE WITH SERVOMOTOR
- AUTOMATIC AIR RELIEF VALVE
- FILLING UNIT
- TEMPERATURE PROBE
- PRESSURE GAUGE
- ELECTRICITY METER (contatore)
- INVERTER FOR PHOTOVOLTAIC (inverter)

KEY TO COLOURS

- DISSIPATION CIRCUIT - DELIVERY
- DISSIPATION CIRCUIT - RETURN
- DHW CIRCUIT
- UTILITY CIRCUIT
- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- ELECTRICAL CONTROL
- ELECTRIC FV CONNECTION

WARNING **The system diagrams shown in this manual are generic and illustrative. For proper installation guidelines, please follow the dimensional and wiring diagrams supplied with the unit.**

NOTES

NOTES

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