DOMESTIC HOT WATER HEAT PUMP

Type: EVHP 7S 260 60; EVHP 7S 200 60; EVHP 260 60; EVHP 200 60



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1. INTRODUCTION

This installation and maintenance manual is to be considered an integral part of the TESY heat pump (hereafter referred to as equipment).

The manual must be kept for future reference until the heat pump itself has been dismantled. This manual is intended for both the specialized installer (installers – maintenance technicians) as well as the end user. The installation modes to be complied with in order to achieve a correct and safe operation of the equipment as well as methods of use and maintenance are described in this manual.

In case of the sale of the equipment or the change of owner, the manual must accompany the equipment to its new destination.

Before installing and/or using the equipment, read this instruction manual carefully and, in particular, chapter 4 relating to safety.

The manual must be kept together with the equipment and, in any case, it must always be at the disposal of the qualified personnel in charge of installation and maintenance.

The following symbols are used inside the manual in order to rapidly find the most important information:

	Information on safety
	Procedures to follow
	Information/ Suggestions

1.1. TESY products

Dear Customer,

Thank you for having purchased this product.

TESY, has always paid a great deal of attention to environmental problems, therefore, it has used technologies and materials with a low environmental impact to manufacture its products in conformity with RAEE – ROHS (2002/95/CE and 2003/108/CE) community standards.

1.2. Disclaimer

The conformity of the content of these user instructions with hardware and software has been submitted to thorough verification. Regardless of this, it is still possible for some non-compliance to occur; therefore, no liability will be assumed for complete conformity.

In the interest of achieving technical perfection, we reserve the right to carry out modifications to the equipment construction or to data at any time whatsoever. Therefore we do not accept any liability claims whatsoever attributable to instructions, figures, drawings or descriptions, without prejudice to errors of any kind.

TESY shall not be held responsible for damages attributable to misuse, improper use, or as a consequence of unauthorized repairs or modifications.



WARNING!: The equipment can be used by children of at least 8 years of age as well as by people with reduced physical, sensory or mental abilities or by those who lack the necessary experience or knowledge, as long as they are supervised or after they have received instructions relating to the safe use of the equipment as well as explanations relating to the use of such equipment.

Children must not play with the equipment. Cleaning and maintenance intended to be carried out by the user must not be performed by unsupervised children.

1.3. Copyright

These user instructions contain information protected by copyright. It is forbidden to photocopy, duplicate, translate or record these user instructions on memory equipment, either in whole or in part without prior authorization of TESY. Any breaches shall be subject to the payment of compensation for any damage caused. All rights are reserved, including those deriving from the issuing of patents or the registration of utility models.

1.4. Operating principle

The equipment belonging to the EVHP series is capable of producing domestic hot water mainly by using heat pump technology. A heat pump is capable of transferring thermal energy from a low temperature source to another with a higher temperature and vice versa (heat exchangers).

The equipment uses a water circuit consisting of a compressor, an evaporator, a condenser and a throttle valve; a liquid/gas coolant flows inside this circuit (see paragraph 4.6).

The compressor creates a difference in pressure inside the circuit that allows a thermodynamic cycle to be obtained: this sucks the coolant fluid in through an evaporator, where the fluid itself evaporates at a low pressure by absorbing heat; it is compressed and driven towards the condenser where the fluid condenses at a high pressure releasing the absorbed heat. After the condenser, the fluid passes through the so-called “throttle valve” and by losing pressure and the temperature starts to vaporize, it re-enters the evaporator and the cycle starts all over again.

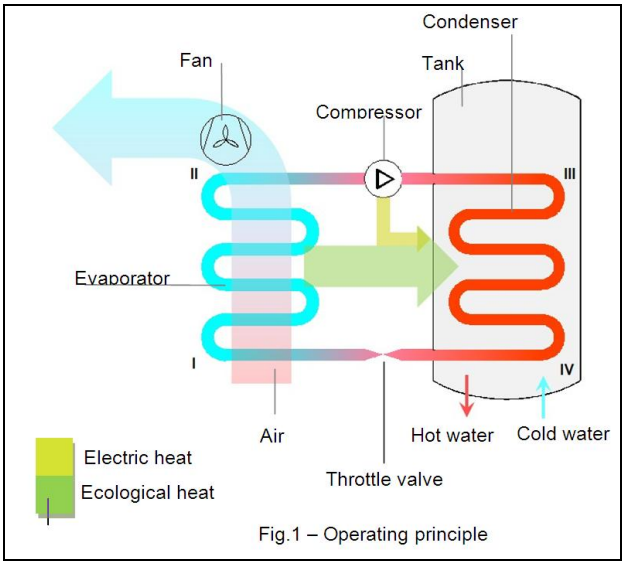


Fig.1 – Operating principle

The operating principle of the equipment is as follows (Fig. 1):

I-II: The coolant fluid sucked in by the compressor flows inside the evaporator and while it evaporates, it absorbs the “ecological” heat given by the air.

At the same time, the ambient air is sucked in by the equipment by a fan; the air loses it heat by passing over the finned-tube battery of the evaporator;

II-III: The coolant gas passes inside the compressor and it under goes an increase in pressure that causes a rise in temperature; transforming this into superheated steam;

III-IV: Inside the condenser, the coolant gas releases its heat to the water inside the tank (boiler). This exchange process makes it possible for the coolant to pass from superheated steam to a liquid state by condensing at a constant pressure and undergoing a reduction in temperature;

IV-I: The liquid coolant passes through the throttle valve, it undergoes a sudden drop in both pressure and temperature and it partially vaporises bringing pressure and temperature back to the initial conditions. The thermodynamic cycle can begin.

1.5. Available versions and configurations

The heat pump is available in two different versions, in relation to the thermal power (EVHP and EVHP S versions). Each version, in turn, can be set up in different configurations, depending on the possible integrations with other heating sources (e.g. solar thermal, biomass power, etc.).

Version	Configuration description
EVHP 200 260	Air source heat pump for the production of domestic hot water
EVHP 7S 200 7S 260	Air source heat pump for the production of domestic hot water suitable for use with the solar power system.
EVHP 7/5 S2 260	Air source heat pump for the production of domestic hot water suitable for use with another heating source (e.g. biomass power).

2 TRANSPORT AND HANDLING

The equipment is supplied in a cardboard box. It is fastened to a pallet with three screws.
Use a fork-lift truck or a pallet truck in order to unload the equipment: it is opportune for these to have a load capacity of at least 250 Kg.



In order to make it easier to loosen the fixing screws the packaged equipment may be put in a horizontal position on its back side.

The unpacking operations must be carried out carefully so as not to damage the equipment enclosure if this is carried out with knives or cutters to open the cardboard packaging.

After having removed the packaging, make sure that the unit is intact. If in doubt, do not use the equipment and seek help from authorized technical staff.

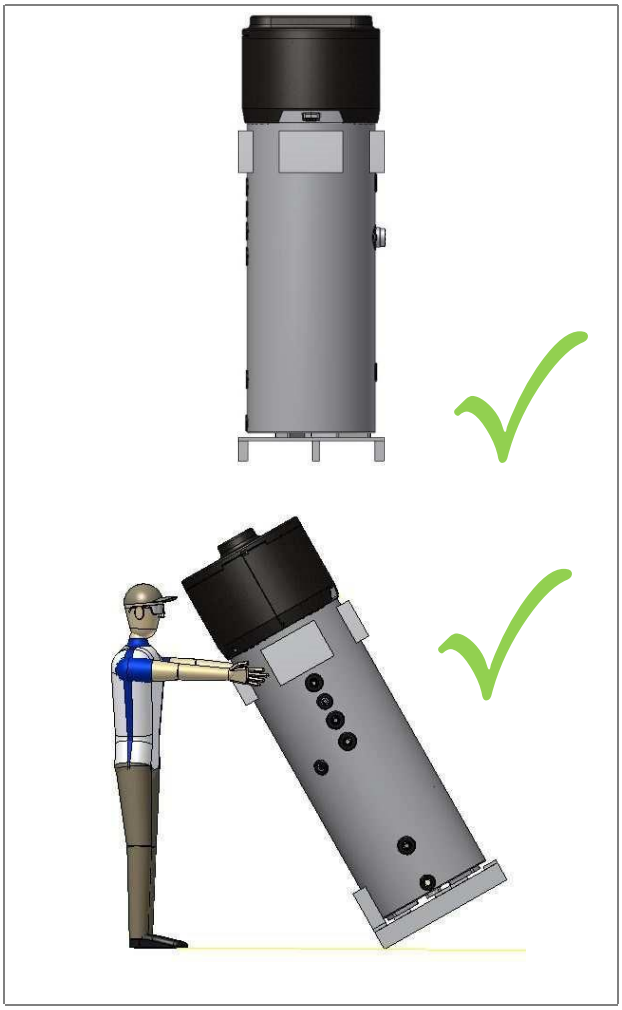
In conformity with environmental protection regulations, make sure that all the accessories supplied have been removed before discarding the packaging.

WARNING! Packaging items (staples, cardboard boxed, etc.) must not be left within the reach of children as they are dangerous.

(*) Note: at the manufacturer’s discretion, the type of packaging may be subject to change.

For the entire period in which the equipment remains idle, waiting to be used, it is opportune to protect it from atmospheric agents.

Positions **permitted** for transporting and handling:



Positions that are **not permitted** for transporting and handling purposes:

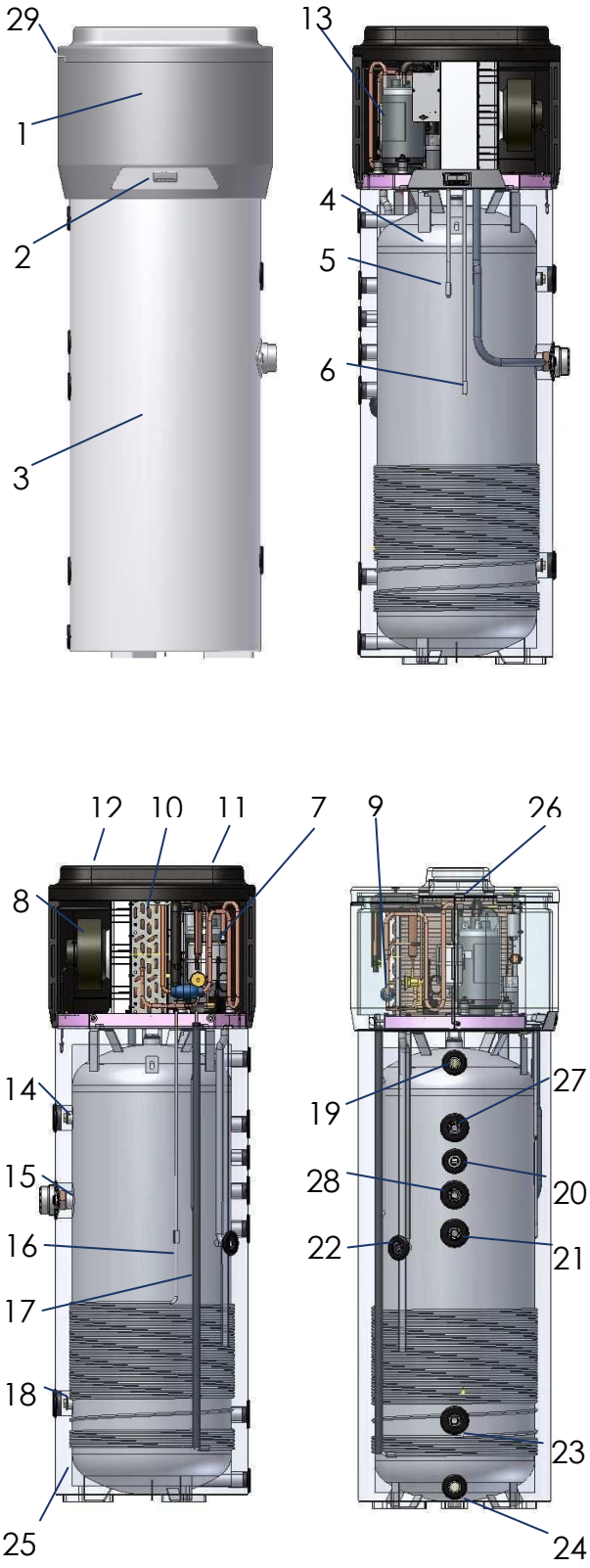


WARNING! During the product handling and installation stages, it is forbidden to put the upper part of the device under any kind of stress whatsoever due to the fact that it is not of a structural nature.

WARNING! the equipment can be transported horizontally only during the last km according to what indicated above (see "Positions permitted for transporting and handling") and taking care of positioning some supports on the lower side of the boiler in order not to lean against the upper part, which is not of a structural nature. When the equipment is transported horizontally, the display must be oriented toward the upper side.

3 CONSTRUCTION CHARACTERISTIC

1	Heat pump.
2	Control panel.
3	Enclosure in embossed ABS.
4	Steel tank (boiler) with double enamelling (capacity: 160; 200; 260 litres).
5	Upper boiler probe.
6	Lower boiler probe.
7	Coolant recharge.
8	Ambient air recirculation fan.
9	Throttle valve.
10	High-efficiency finned evaporator. The quantity of fluid put into this is regulated by an appropriate thermostatic valve.
11	Air inlet (∅ 160 mm).
12	Air outlet (∅ 160 mm).
13	Hermetically-sealed rotary compressor.
14	Replaceable magnesium anode.
15	(1.5 kW – 230 W) Electric heating element
16	Condenser pump discharge line.
17	Condenser return.
18	Replaceable magnesium anode.
19	Hot water outlet connection joint (G 1”).
20	Recirculation fitting (G ¾”).
21	Inlet, coil fitting for solar thermal power system (G 1”$^{1/4}$; 1 m^{2}exchange surface).
22	Condensates drain (G 1/2”).
23	Outlet, coil fitting for solar thermal power system (G 1”$^{1/4}$; 1 m^{2}surface).
24	Cold water inlet connection joint (G 1”).
25	50 mm polyurethane insulation.
26	Automatic resetting safety pressure switch.
27	Coil fitting for auxiliary heat source (G 1”$^{1/4}$; 0.6 m^2 surface) - Inlet
28	Coil fitting for auxiliary heat source (G 1”$^{1/4}$; 0.6 m^2 surface) - Outlet
29	Air inlet filter.



Descriptions		EVHP 7S 260 60	EVHP 260 60	EVHP 7S 200 60	EVHP 200 60
COPDHW (**1**)	W/W	3.6	3.6	3.3	3.3
COPDHW (**2**)		3.1	3.1	3.0	3.0
HP thermal poweryield	kW	1.82	1.82	1.82	1.82
Total thermal power	kW	3.4	3.4	3.4	3.4
Heating time ([2])	h:m	10:14	10:14	7:39	7:39
Heating time in BOOST mode ([2])	h:m	05:06	05:06	3:58	3:58
Heat losses 65°C ([3])	kWh/24h	1.6	1.6	1.4	1.4
Electrical data					
Power supply	V	1/N/230			
Frequency	Hz	50			
Degree of protection		IPX4			
HP maximum absorption	kW	0.53			
Average absorption	kW	0.43			
Heating element + HP maximum absorption	kW	2.03			
Electric heating element power	kW	1.5			
Maximum current in HP	A	2.4			
Required overload protections	A	16A T fuse/ 16A automatic switch, characteristic C (to be expected during installation on power supply systems)			
Internal protection		Single safety thermostat with manual reset on a resistive element			
Operating conditions					
Min.÷ max temperature heat pump air intake (90% R.H.)	°C	-7÷38			
Min. ÷ max temperature installation site	°C	5÷38			
Working temperature					
HP Maximum settable temperature - ECO cycle	°C	56			
Maximum settable temperature in an AUTOMATIC cycle	°C	70			
Compressor		Rotary			
Compressor protection		Thermal circuit breaker with automatic reset			
thermodynamic circuit protection type		Safety pressure switch with automatic reset			
Fan		Centrifugal			
Ejection outlet diameter	mm	160			
Revolutions per minute	rpm	1650÷2100			
Nominal air capacity	m^3/h	350÷500			
Max. pressure head available	Pa	200			
Motor protection		Internal thermal circuit breaker with automatic reset			
Condenser		Wrapped externally, not in contact with water			
Coolant		R134a			
Load	g	900			
Water storage					
Water storage capacity	l	260	260	200	200
Max. quantity of hot water that can be used Vmax ([4])	l	342	342	276	276
Coil for connection to solar thermal power system	m^2	0.75 m^2	N/A	0.75 m^2	N/A
Coil for connection to an auxiliary heating source	m^2	N/A	N/A	N/A	N/A
Cathodic protection		2 x Mg anode Ø32x260 mm			
Insulation		50 mm rigid PU			
Defrosting		Active with Hot gas valve			
Transport weight	Kg	115	98	99	95
Sound power Lw(A) ([5])	dB(A)	59			
Automatic anti-Legionnella disinfection cycle ([6])		YES			
Maximum working pressure	Bar	7			

(1) temperature of incoming air supply 15°C, R.H. 87%, temperature of boiler storage environment 15°C, water heated from 10°C to 55°C, (according to UNI EN 16147-2011)
(2) temperature of incoming air supply 7°C R.H. 87%, temperature of boiler storage environment 20°C, water heated from 10°C to 55°C, (according to UNI EN 16147-2011)
(3) measurements carried out according to UNI EN 12897-2006
(4) measurements carried out according to UNI EN 16147-2011
(5) measurements carried out according to EN ISO 3471-2010
(6) Automatic activation every 30 days of operation

4. IMPORTANT INFORMATION

4.1 Conformity with European regulations

The EVHP heat pump is a device intended for domestic use in conformity with the following European directives:

- 2012/19/UE Directive on general product safety;
- 2011/65/RoHS Directive on the restrictions of use of certain hazardous substances in electric and electronic equipment (RoHS);
- Directive 2003/108/CE - Hazardous substances in electric and electronic equipment (RAEE);
- Directive 2004/108/CE - Electromagnetic compatibility (EMC);
- Directive 2006/95/CE – Low Voltage Directive (LVD).

4.2 Degrees of protection provided by enclosures

The degree of protection of the equipment is equal to: IPX4.

4.3 Limitations of use

WARNING!: This device has not been designed, nor is it intended for use within hazardous environments (due to the presence of potentially explosive atmospheres –according to ATEX standards or with a requested IP level exceeding that of the equipment) or in applications that require (fault-tolerant, fail-safe) safety characteristics such as in circuit-breaking systems and/or technologies or in any other context in which the malfunctioning of an application could cause death or injury to people or animals or serious damage could be caused to objects or the environment.

N.B.: In the event of a product breakdown or fault, this could cause damage (to people, animals and goods). It is necessary to arrange for a separate functional monitoring system with alarm functions in order to avoid such damage being caused. Moreover, it is necessary to arrange for a back-up service in case of failure!

4.4 Operating limits

The above mentioned device is intended to be used exclusively for the heating of domestic hot water within the foreseen limitations of use (paragraph 3.1).

The equipment can only be installed and started up for the intended use within closed heating systems in conformity with the EN 12828 standard.

N.B.: The manufacturer shall not be held responsible under any circumstances in the event that the equipment is used for other purposes than for which it has been designed and as regards any installation errors or equipment misuse.

WARNING! It is forbidden to use the device for purposes other than those intended. Any other use is to be considered improper and therefore not allowed.

N.B.: During the design and construction stage of the systems, current local rules and provisions are complied with.

4.5 Fundamental safety rules

- The device must be used by adults;
- Do not open or disassemble the device when this is connected to the power supply;
- Do not touch the device with wet or humid body parts when barefoot;
- Do not pour or spray the device with water;
- Do not stand, sit and/or rest anything on the device.

4.6 Information on coolant used

This device contains fluorinated greenhouse gas included in the Kyoto protocol. Do not discard such gas into the environment.
Coolant type: HFC-R134a.

5. INSTALATION AND CONNECTION

WARNING! Installation, commissioning and maintenance of the device must be performed by qualified and authorised personnel. Do not attempt to install the device yourself.

5.1 Preparation of the installation site

The installation of the device must be carried out in a suitable place in order to allow the normal use and adjustment operations, together with ordinary and extraordinary maintenance to be performed. Therefore it is important to allow for the necessary working space by referring to the dimensions
Shown in Fig. 2.

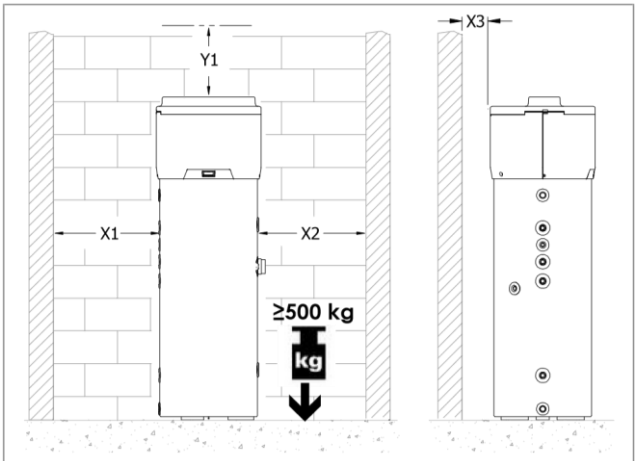


Fig. 2 – Minimum space

X1	X2	X3	Y1
650 mm	650 mm	200 mm	300 mm

Moreover, the premises must:

- Have adequate water and power supply lines;
- Be available and ready for connection to the condense drain;
- Be available and ready with adequate discharge pipes in case of damage caused to the boiler or actuation of the safety valve or breakage of pipes/connections;
- Have containment systems in case of serious water leaks;
- Be sufficiently lit (where appropriate);
- Not measure less than 20 m^3;
- Be frost-proof and dry.

WARNING! In order to avoid the propagation of mechanical vibrations, do not install the equipment on floor slabs with wooden beams (e.g. in lofts).

5.2 Ventilation connection

Apart from the space indicated in paragraph 5.1, the heat pump requires adequate ventilation.

It is necessary to create a dedicated air duct as indicated in the following illustration (Fig. 3).

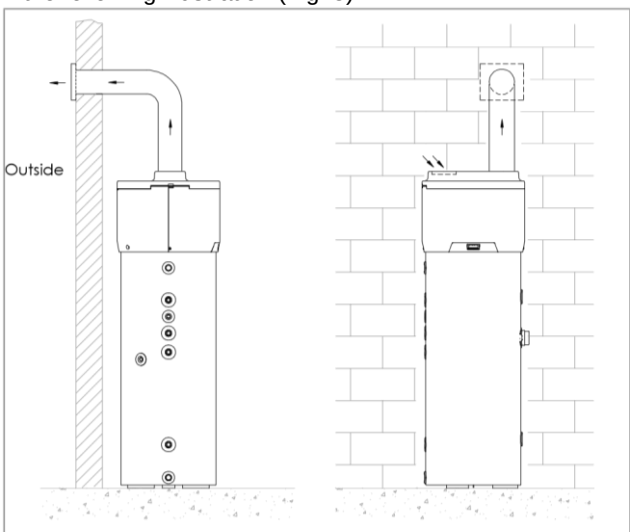


Fig. 3 – Example of an air outlet duct

Moreover, it is important to ensure an adequate ventilation of the premises where the equipment is to be installed.

An alternative solution is indicated in the following illustration (Fig. 4): this consists of a second duct that draws air in from outside instead of directly from inside the premises.

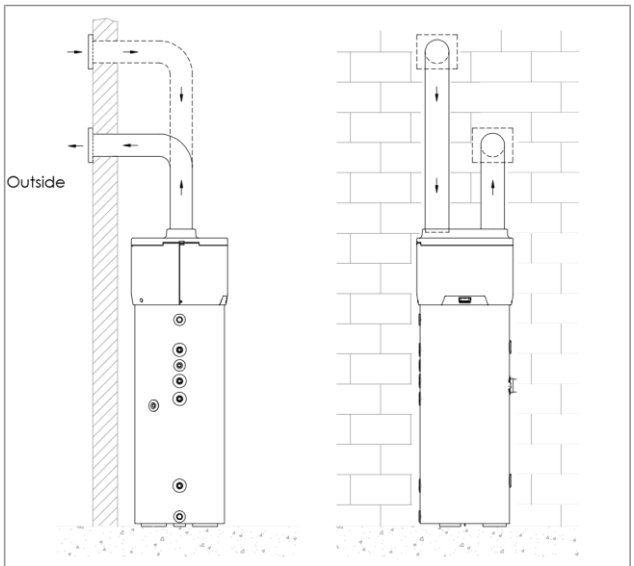


Fig. 4 – Example of dual duct connection

Carry out the installation of each air duct taking care that:

- The weight of such does not adversely affect the equipment itself;
- Maintenance operations can be carried out;
- This is adequately protected so as to avoid the accidental intrusion of material inside the equipment itself;
- The maximum total allowable pressure drop for all components, including through holes for mounting on external wall, within the pipe system does not exceed 200 Pa.

During operation, the heat pump tends to lower the ambient temperature if the external air duct is not carried out.

An appropriate protection grid must be installed in line with the discharge pipe conveying air to the outside with the aim of avoiding foreign bodies from entering the equipment. In order to guarantee maximum device performance, the grid chosen must ensure low pressure loss.

In order to avoid the formation of condensate: insulate the air discharge pipes and the air duct cover connections with steam-tight thermal cladding of an adequate thickness.

If it is considered necessary in order to prevent flow noise, sound mufflers can be mounted.
Fit the pipes, the wall through holes and the connections to the heat pump with vibration damping systems.

WARNING! the simultaneous operation of an open-flue firebox (e.g. an open-flue fireplace) together with the heat pump causes a dangerous environmental pressure drop. This could cause the backflow of exhaust gas into the environment itself.
Do not operate the heat pump together with an open-flue firebox.
Use only sealed-chamber fireboxes (approved) with a separate duct for combustion air.
Keep the doors to the boiler room closed and hermetically sealed if they do not have a combustion air supply in common with inhabited areas.

5.2.1 Particular installation conditions

One of the peculiarities of the heat pump heating system is represented by the fact that these units cause a considerable reduction of the air temperature that is generally ejected from inside the home. Apart from being colder than the ambient air, the exhaust air is also completely dehumidified; for this reason, it is possible to allow the air to flow back into the home in order to cool specific environments or rooms during the summer.
Installation consists of the splitting of the discharge pipe to which two shutters are applied (“A” and”) with the aim of directing the air flow either towards the outside or the inside of the home (Fig. 5b).

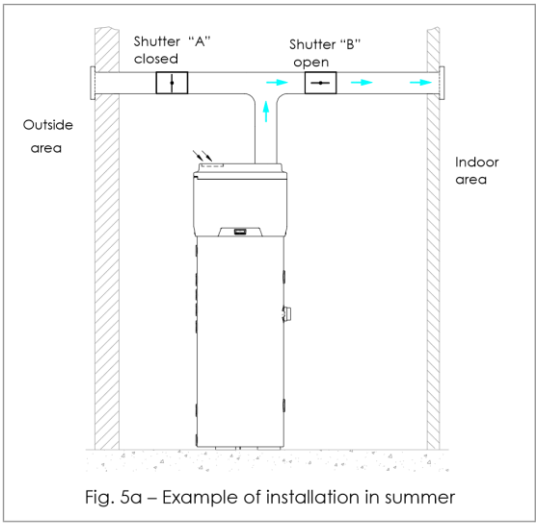


Fig. 5a – Example of installation in summer

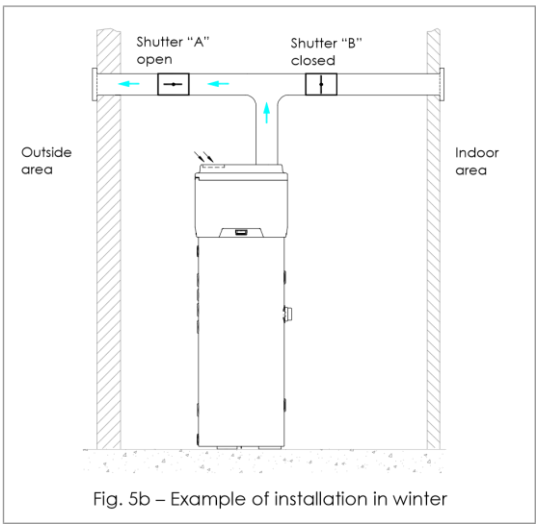


Fig. 5b – Example of installation in winter

5.3 Device mounting and connection

The device must be installed on a stable, flat floor surface that is not subject to vibration.

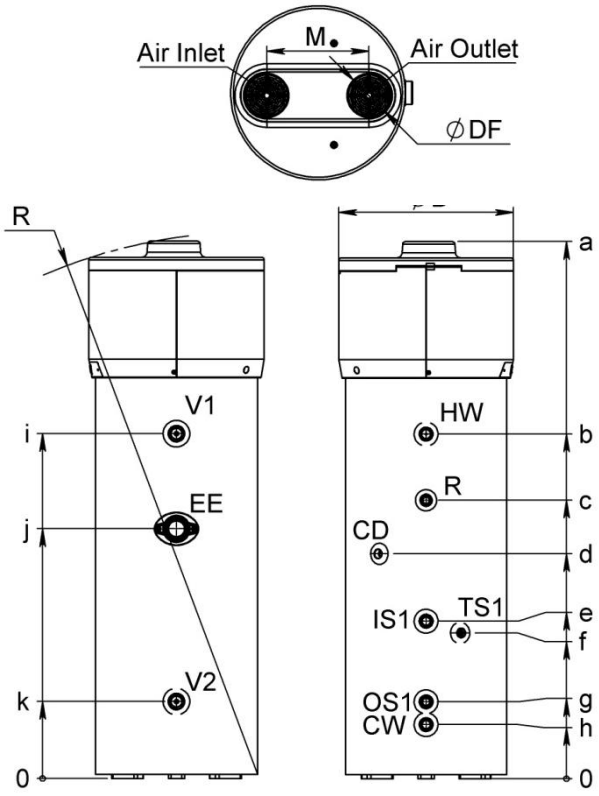


Fig.6 – Overall dimensions

Dimenssions [±5mm]	260 60	200 60
a [mm]	2004	1700
b [mm]	1286	981
c [mm]	1039	734
d [mm]	839	769
e [mm]	588	588
f [mm]	544	544
g [mm]	287	287
h [mm]	202	202
i [mm]	1286	1000
j [mm]	931	716
k [mm]	287	287
R [mm]	2025	1751
ØD [mm]	650	650
ØDF [mm]	160	160
M [mm]	380	380

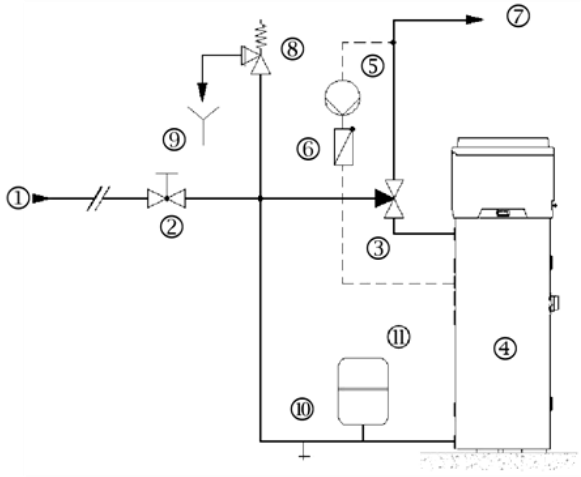
5.4 Water supply connections

Connect the cold water inlet and the outlet pipes to the appropriate connection points

The table below shows the characteristics of the connection points.

CW - cold water inlet - G1"
HW - hot water outlet - G1"
IS - solar flow - G1"
OS - solar return - G1"
TS - thermosensor - G 1/2"
R - recirculation - G 3/4"
EE - opening for electrical element - G 11/2
V1,2 - Mg anodes - G11/4

The following illustration (Fig. 7) shows an example of a water supply connection.



① Water inlet pipe;
② Shut-off valve;
③ Automatic thermostat mixing equipment
④ Heat pump
⑤ Ricirculation pump
⑥ Spring check valve
⑦ Hot water outlet pipe
⑧ Safety valve
⑨ Inspectionable end of discharge pipe
⑩ Drain tap
⑪ Expansion vessel

Fig. 7 – Example of the water supply system

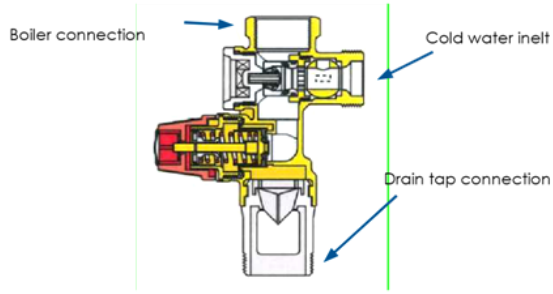


Fig. 8a – Example of heavy series safety valve

N.B.: It is compulsory to install a dirt filter on the cold water inlet pipe. The trary, when the water hardness is particularly high (higher than 25°F), it is recommended to use a water softener, properly calibrated and monitored; in this case the residual hardness should not fall below 15°F.

PLEASE NOTE!: It is advisable for the system installer to install a 7-bar safety valve on the cold water intake pipe (Fig. 8a).

N.B.: The safety equipment for protection against over pressure must be op- erated regularly in order to remove limescale deposits and to check that it is not blocked (Fig. 8a)

N.B.: For a proper installation of the equipment, a hydraulic safety group in accordance to UNI EN 1487:2002 standard should be provided. It should include at least: a shut-off valve, a check valve, a control device of the check valve, a safety valve, a device to interrupt the water load (Fig. 8a)

N.B.: The drain pipe connected to the equipment for protection against over pressure must be installed sloping continuously downwards and in a place where it is protected against the formation of ice (Fig. 8a)

WARNING!: in case an expansion vessel is not being installed, make sure that in the cold water intake there is not any non-return valve installed.

WARNING!: The heat pump for the pro duction of domestic hot water is capable of heating water up to more than 60°C. For this reason, as a protection against burns, it is necessary to install an automatic thermostat mixing equipment to the hot waterpipe (Fig.

5.4.1 Condense drain connections

Condensate that forms during the operation of the heat pump flows through an appropriate discharge pipe (G 1/2") that passes inside cladding and it comes out on the side of the equipment. This must be connected to a duct via a siphon so that the condensate can flow freely (Fig. 8 or Fig. 9).

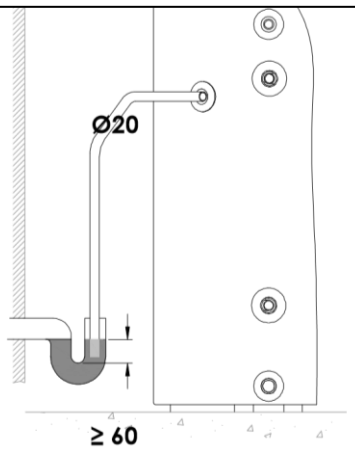


Fig. 8 – Examples of condensate drain connection via siphon

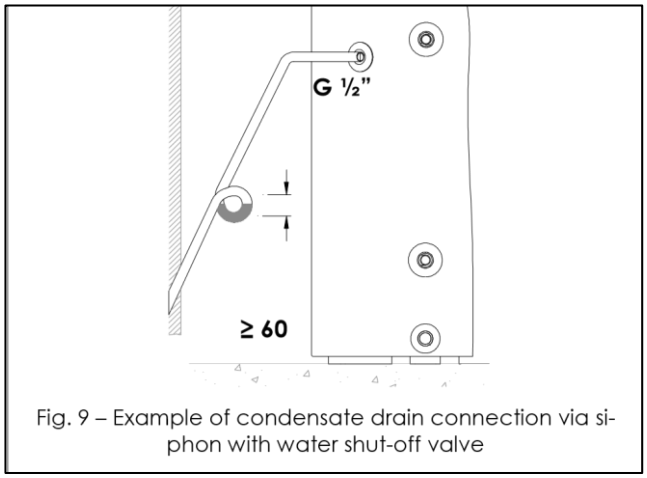
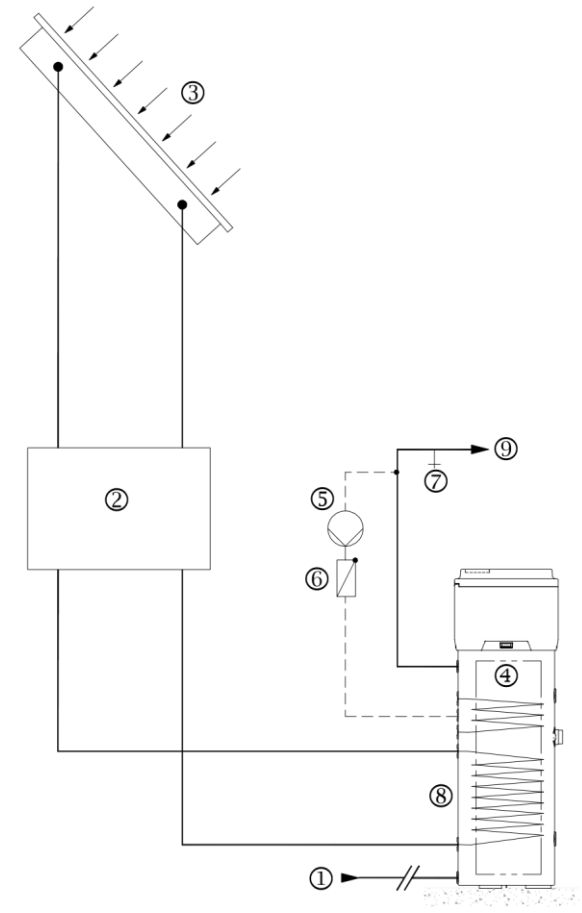


Fig. 9 – Example of condensate drain connection via siphon with water shut-off valve

5.5 Solar power system integration

The following illustration (Fig. 10) shows an example of solar power system integration.



① Cold water intake pipe
② Solar power system pump and accessories
③Solar collectors
④ Heat pump
⑤ Recirculation pump
⑥ Spring check valve
⑦ Drain tap
⑧ Solar thermal power coil
⑨Hot water outlet pipe

Fig. 10 – Example of solar power system integration

5.6 Electrical connections

The device is supplied already wired for the mains power supply. It is powered through a flexible cable and a socket/plug combination (Fig. 11 and Fig. 12).An earthed Schuko socket with separate protection is needed for the connection to the mains power supply.

WARNING! The power supply to which the equipment will be connected must be protected by an adequate residual current circuit breaker.

The type of residual current circuit breaker must be chosen by evaluating the type of electric equipment to be used on the entire system.

With reference to the connection to the mains power supply and the safety equipment (e.g. residual current circuit breaker) comply with standard IEC 60364-4-41.



Fig. 11 –A *Schuko* socket

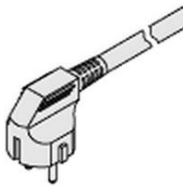


Fig. 12 –Equipment plug

5.6.1. Remote links

The equipment is designed to be connected to other remote energy systems (photovoltaic and solar thermal power systems).

The user interface has two digital inputs with the following functions:

Digital 2: Input from photovoltaic system. The "Green" function is enabled when a free contact is established between terminals 31 and 32 (cable: white/green). This function exploits any overproduction of electricity and it increases the temperature of the water in the storage tank until it reaches the temperature set by the user (70°C default temperature);

Digital 1: Input from the solar thermal power system. The heat pump operation is disabled for a set time when a free contact is established between terminals 30 and 31 (cable: brown/yellow) The cycle has the purpose of optimizing the performance of the solar thermal power system.

5.6.1.1 Remote link mode

As regards links to digital inputs, the equipment is provided with an additional 4-core cable that has already been linked to circuit board of the user interface (placed inside the equipment Fig. 15). The remote links to any energy systems must be carried out by a qualified installer (junction boxes, terminals and connection cables).
The following illustrations show an example of a remote link (fig. 13 and fig. 14a)

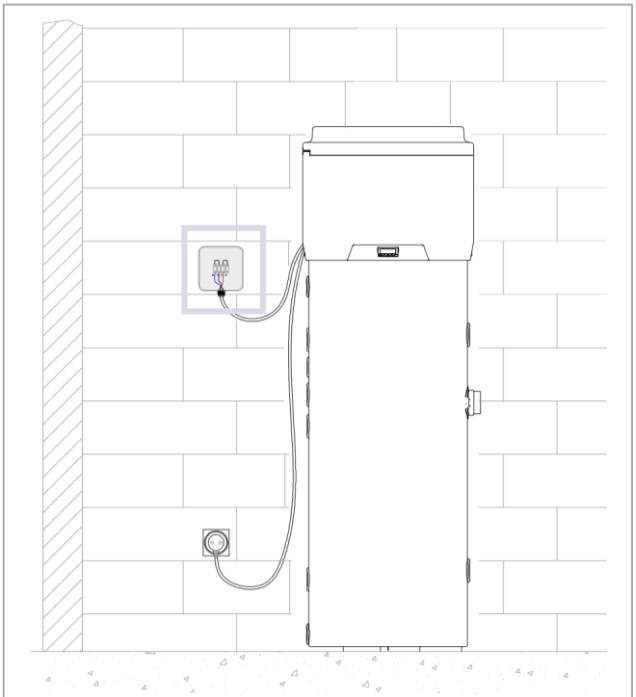


Fig. 13 – Example of a remote link

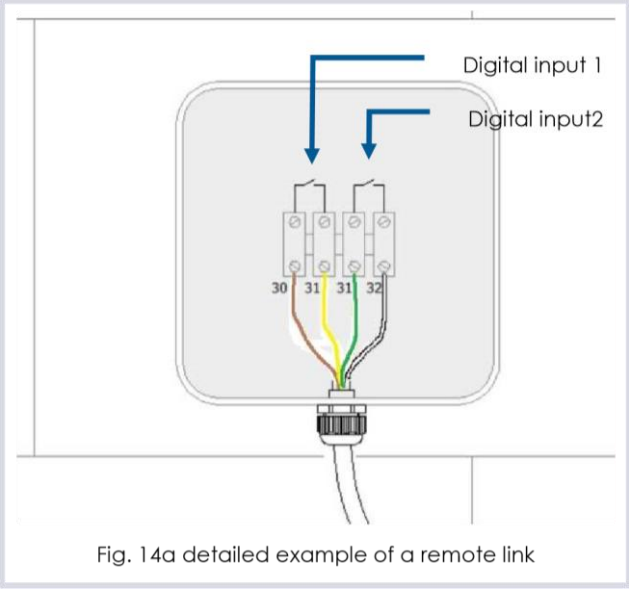


Fig. 14a detailed example of a remote link

To access the 4-core cable for remote connection it is necessary to remove the upper cover of the boiler (see paragraph 8.1 Fig. 108), and take the cable outside through the dedicated opening, that is already present on the back cover, as indicated in Fig. 54.



Fig.15– Cables for remote connection

5.7. Wiring diagram

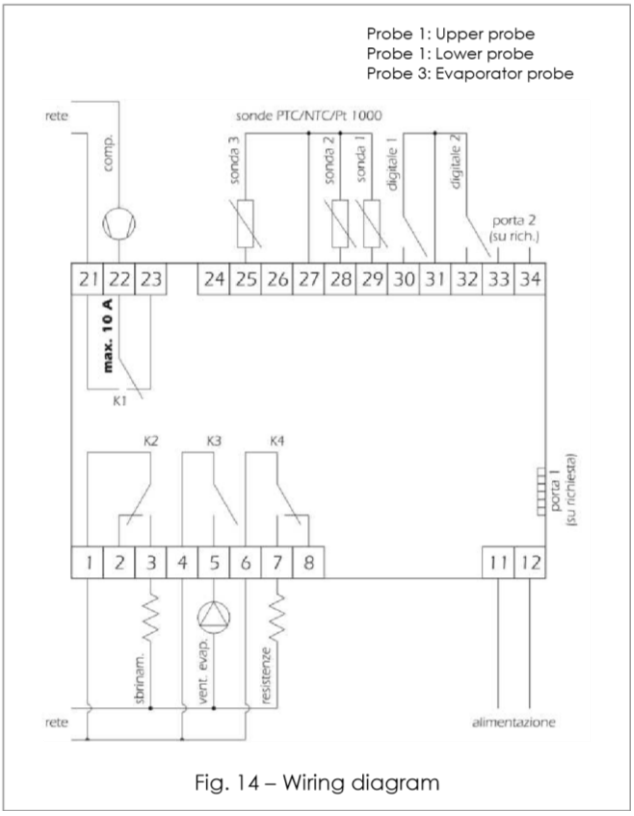


Fig. 14 – Wiring diagram

6. COMMISSIONING



WARNING! Check that the equipment is connected to the earth cable.



WARNING! Check that the line voltage corresponds to that indicated on the equipment identification plate.

The commissioning procedure must be carried out by performing the following procedures:

- Fill the boiler by acting on the water inlet tap and check that there are no leaks from gaskets and connections. Tighten the bolts or connections where necessary;
- Do not exceed the maximum permitted pressure indicated in the “general technical data” section;
- Check that the water circuit safety equipment is working;
- Connect the plug to the power socket;
- When the plug is inserted, the boiler is in standby, the display remains switched off, the power key is illuminated;
- Press the power key (see paragraph 7.1.3.1), the equipment starts up in the “ECO” mode (default setting) 5 minutes after pressing the key.

7. OPERATING MODE.

The management of the device is assigned to a user interface that enables the: • Setting of the operating mode;

- Modification of the operating parameters;
- Display and management of any emergency situations;
- Verification of the state of resources.

Below, the term “start” intends the switching from the Stand-by to the ON status; the term “switch off” intends the switching from the ON to the Stand-by status.

Below, the term “advanced procedure” refers to particular procedures of the tool described in the paragraphs relating to “advanced management”.

7.1 The USER INTERFACE

The user interface (Fig. 15) allows the verification and the adjustment of the equipment operation. This is equipped with a display and the following keys: • On/Stand-by key;

- SET key;
- DOWN key;
- UP key.

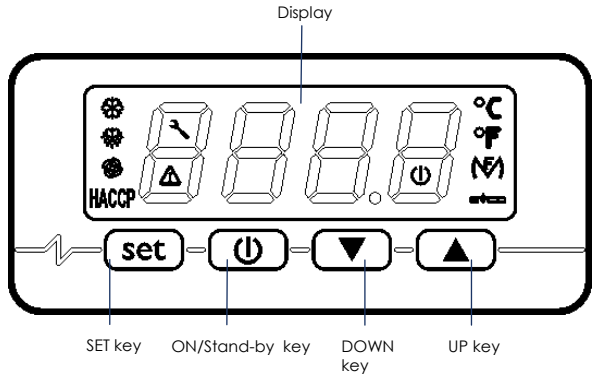


Fig. 15 – User interface

7.1.1 Interface keys and display

7.1.1.1 The ON/Stand-by key

By means of this key it is possible:

- To switch the device on (ON status);
- To switch the device to the Stand-by status (in this status, the instrument can automatically switch on in certain time slots and independently enable the anti-Legionella and defrosting functions.

When the equipment is switched on, it shows the status it was in when it was previously switched off.

7.1.1.2 The [SET]key

By means of this key it is possible to:

- Confirm set choices or values.

7.1.1.3 The [UP]key

By means of this key it is possible to:

- Scroll up the list of the various parameters;
- Increase the value of a parameter.

7.1.1.4 The [DOWN]key

By means of this key it is possible to:

- Scroll down the list of the various parameters;
- Reduce the value of a parameter.

7.1.1.5 The Interface Display

The interface display (Fig. 16) makes it possible to visualize:

- Regulation temperatures;
- Alarm/Error codes;
- Status messages;
- Operating parameters.



Fig. 16 – User interface display

	Compressor LED	If this is lit: the compressor is active. It this is flashing: • The compressor switching on procedure is in progress. • The modification of the operating set points is in progress;
	Defrosting LED	If this is lit: defrosting is in progress
	MF LED	If this is lit: the electric heating element is on
	Fan LED	If this is lit: the fan is active
	Maintenance LED	If this is lit: maintenance of the air filter is required (if present)
	Alarm LED	If this is lit: check the list of alarms and follow the procedure indicated in this manual
	Degree Celsius LED	If this is lit: the unit of measurement for temperatures is the degree Celsius

°F	Degree Fahr-enheit LED	If this is lit: The unit of measurement for temperatures is the degree Fahrenheit.
⏻	On/stand-by LED	If this is lit: the equipment is in the stand-by status. If it is flashing, the equipment has been switched on/off manually during a switching on/off period in a certain timeslot.
HACCP		Not used

7.1.2 Operating logic

7.1.2.1 Operating modes

The equipment foresees the following operating modes:

- **AUTOMATIC operating mode**

This mode mainly uses the renewable energy of the heat pump as a support measure, the electric heating elements can be enabled; these latter heating sources are enabled if the water temperature is below a certain level, or in the event that a temperature exceeding
62°C is required;

- **ECONOMY operating mode**

This mode uses only the renewable energy of the heat pump without ever enabling the electric heating elements. It takes longer to enable but it has considerable energy saving characteristics;

- **OVERBOOST operating mode**

This mode makes it possible to heat water rapidly by using both the heat pump and the electric heating elements. This function can be manually enabled when the temperature of the water inside the storage tank is below 40°C. At the end of the heating process, the function is automatically disabled and the equipment is automatically restored to the Automatic or Economy mode depending on which of these functions was previously set by the user;

- **ANTI-LEGIONELLA operating mode**

This function is used as an anti-bacterial treatment by increasing the temperature of the water to 70°C. This function is periodically and, in any case, automatically enabled every 30days, regardless of the operating mode enabled;

- **DEFROSTING mode**

This function is necessary in order to eliminate the frost deposits that form and which prevent heat transmission. This function is automatically enabled when the equipment is operated at low environmental temperatures.

When the equipment is switched on for the first time, it is pre-set by the manufacturer in the ECO (Economy) mode with a water set point of 55°C with the aim of guaranteeing the best possible energy saving function with the support of only renewable energy sources. Please note that the use of such function guarantees the user an average energy saving of approx. 70% when compared to a normal electric boiler.

7.1.3 Basic management

7.1.3.1 Manual switching on /off of the equipment

- Keep the ⏻ key pressed for 1 second: the on/stand-by LED will switch off/on.
- The equipment can be switched on/off also in certain timeslots; the parameters HOn and HOF can be seen (paragraph 7.1.3.4).

Manual switching on/off always has the priority over the timeslot operating mode.

If the keyboard has been locked (paragraph 7.1.3.3) or an advanced procedure is in progress, it will not be possible to carry out the normal switching on/off of the equipment.

Every time the equipment is switched on, a series of internal inspections are carried out before the heat pump is enabled. Such condition is reported by means of the flashing of the compressor indicator light ❄. Once the verification period has passed (approx. 5 minutes) the indicator light remains lit and this indicates that the unit is switched on.

7.1.3.2 Change of operating mode (AUTO-MATIC, ECONOMY and OVERBOOST)

7.1.3.2.1 AUTOMATIC operating mode

To manually start the AUTOMATIC mode, carry out the following procedure:

- Make sure that the keyboard is not locked (paragraph 7.1.3.3) and that no other advanced procedure is in progress;
- Press per the ▼ key for 1 second, “Auto” starts to flash;
- Press the set key again to confirm and start the AUTOMATIC operating mode.

To exit the procedure:

- Press the ⏻ key to exit this procedure without changing the mode.

7.1.3.2.2 ECO (economy) operating mode

To manually start the ECO operating mode, carry out the following procedure:

- Make sure that the keyboard is not locked (paragraph 7.1.3.3), that no other advanced procedure is in progress and that the equipment is not in the Overboost operating mode;
- Press the ▼ key for 1 second, "ECO" starts to flash;
- Press the set key again to confirm and start the ECONOMY operating mode.

To exit the procedure:

- Press the ⏻ key to exit this procedure without changing the mode.

7.1.3.2.3 OVERBOOST operating mode

To manually start the OVERBOOST operating mode, carry out the following procedure:

- Make sure that the keyboard is not locked (paragraph7.1.3.3) and that no other advanced procedure is in progress;
- Press the ▼ key for 1 second, either "ECO" or "Auto" starts to flash;
- Press the ▲ or ▼ keys until "**ObSt**" flashes on the display;
- Press the set key again to confirm and start the OVERBOOST operating mode.

To exit the procedure:

- Press the ⏻ key to exit this procedure without changing the mode.

7.1.3.3 Keyboard locking/unlocking

To lock the keyboard, carry out the following procedure:

- Make sure that no other advanced procedure is in progress;
- Keep the ⏻ and the ▼ keys pressed for 1 second: "**Loc**" will be shown on the display for 1 second.

If the keyboard is locked, it will not be possible to carry out any kind of operation on the display interface.

By pressing any key, "**Loc**" will be shown for 1 second on the display.

To unlock the keyboard:

- Keep the ⏻ and the ▼ keys pressed for 1 second: "**UnL**" will be shown for 1 second on the display.

7.1.3.4 Temperature setting in the ECO operating mode (SP1)

- Make sure that the keyboard is not locked (paragraph 7.1.3.3) and that no other advanced procedure is in progress;
- Press and release the set key: "**SP1**" will be shown on the display;
- Press and release the set key: the compressor LED ❄ will flash;
- Press either the ▲ or the key ▼ within 15 seconds; parameters r3, r4 and r5 can be seen;
- Press and release the set key or do not carry out any other operations for 15 seconds: the compressor LED ❄ will switch off;
- Press and release the ⏻ key.

To exit the procedure before its completion:

Do not carry out any operations for 15 seconds (any changes will be saved).

7.1.3.5 Temperature setting in the Automatic mode (SP2)

- Make sure that the keyboard is not locked (paragraph 7.1.3.3) and that no other advanced procedure is in progress;
- Press and release the set key: "SP1" will be shown on the display;
- Press either the ▲ or the key ▼ until "**SP2**" is shown on the display;
- Press and release the set key: the compressor LED will flash;
- Press either the ▲ or the key ▼ within 15 seconds; parameters r1, r2 and r5 can also be seen;
- Press and release the set key or do not carry out any other operations for 15 seconds: the compressor LED (❄) will switch off;
- Press and release the ⏻ key.

To exit the procedure before its completion:

- Do not carry out any operations for 15 seconds (any changes will be saved).

7.1.3.6 Timeslot settings for the switching on/off of the equipment

N.B.: before proceeding with the timeslot settings, set day and real time as described in paragraph 7.1.3.14

To start the procedure:

- Make sure that the keyboard is not blocked and that no other advanced procedure is in progress;
- Press and release the set key: "SP1" will be shown on the display.

To set the first timeslot:

- Press and release either the ▲ or the ▼ key within 15 seconds to select "**HOn1**" (first switching on time) and/or "**HOf1**" (first switching off time); select "**HOn2**" and "**HOF2**" for the second switching on/off time;
- Press and release the set key;
- Press and release either the ▲ or the ▼ key and within 15 seconds;
- Press and release the set key or do not carry out any other operations for 15 seconds.

To associate a time slot to a certain day of the week:

- After the previous procedure has been carried out, press either the ▲ or the ▼ key and then let it go within 15 seconds in order to select "**Hd1**" (switch on time for day 1, or rather Monday) and/or "**Hd2...7**" (switching on time for days 2-7, or rather Tuesday-Sunday);
- Press and release the set key;
- Press and release either the ▲ or the ▼ key within 15 seconds in order to select "1" (the first switch on/off time) or "2" (the second switch on/off time);
- Press and release the set key or do not carry out any other operations for 15 seconds.

To exit the procedure before its completion:

- Do not carry out any operations for 15 seconds (any changes will be saved) or press the ⏻ key and then let it go.

Carefully evaluate enabling of time slot operation in order to avoid malfunctions caused by users.

7.1.3.7 Display of the operating status

- Make sure that the keyboard is not locked (paragraph 7.1.3.3) and that no other advanced procedure is in progress;
- Press and release the ▼ key: Auto/ECO/Obst/Anti will be displayed for 3 seconds depending on the current active operative status.

7.1.3.8 Silencing of the alarm sound

To silence the alarm, carry out the following procedure:

- Make sure that no other advanced procedure is in progress;
- Press any key once.

ADVANCED MANAGEMENT

N.B.: The following instructions are reserved for specialised technical assistance personnel.

7.1.3.9 Different operating mode start conditions

Each operating mode must comply with precise conditions in order to be enabled:

- **AUTOMATIC** operating mode

The condition in order to enable the start of this function is as follows: lower probe< SP2 – r0 (hysteresis);

- **ECO** operating mode

The condition in order to enable the start of this function is as follows: lower probe< SP1 – r0 (hysteresis);

- **OVERBOOST** operating mode

The condition in order to enable the start of this function is as follows: lower probe< SP3and upper probe< SP3.Once a temperature exceeding SP3 has been detected, the Overboost operating mode terminates and the previously set operative mode is restored.

7.1.3.10 The display

If the equipment is in the "ON" status, during normal operation, the display will show the established temperature by means of parameter P5:

- If P5 = 0, the display will show the temperature of the upper part of the boiler;
- If P5 = 1, the display will show the active working set point;
- If P5 = 2, the display will show the temperature of the lower part of the boiler;
- If P5 = 3, the display will show the temperature of the evaporator;
- If the equipment is in the "stand-by" status, the display will be switched off.

7.1.3.11 Alarms

Note: in case of "**UtL**" alarm (fault of the fan), in addition to the display visualization, the equipment emits an acoustic signal that can be switched off pressing any key on the controller. The alarm it is never canceled unless the equipment is switched off or put in stand-by.

The heat pump working mode is automatically disabled and the one with electric resistance is activated in order to ensure the continuity of the warm water supply.

PLEASE NOTE!: in case of "UtL" alarm it is necessary to contact the technical assistance.

AL	*Minimum temperature alarm*
	Solution: - Check the temperature associated with the alarm; - Parameters displayed: A0, A1, A2 and A11. Main consequences: - The equipment will continue to work as normal
AH	*Maximum temperature alarm*
	Solutions: - Check the temperature associated with the alarm; - Parameters displayed: A3, A4, A5 and A11. Main consequences: - The equipment will continue to work as normal.
id	Digital input alarm
	Solutions: - Check the causes that originated the input activation (possible short circuit in signal cables) - See parameters: i0; i1 and i2; Main consequences: - Compressor will be switched off; - Defrosting will not be activated.
iSd	Blocked equipment alarm
	Solutions: - Check the causes that originated the digital input activation - See parameters: i0; i1; 18 and i9 - Switch the equipment off and then back on again or disconnect the equipment from the mains power supply. Main consequences: - Compressor will be switched off; - Defrosting will be never activated.
FiL	Ventilation filter check alarm
	Solutions: - Check how clean the filter is (to switch off the alarm message, press any key on the display)
UtL	Probable fan fault
	Solutions: - See parameters SP10 and C14 - Check the fan conditions Main consequences: - Compressor and fan are switched off; - Water heating occurs using only the electric resistance.

When the cause of the alarm has been removed, the normal operation of the equipment is restored.

7.1.3.12 Error messages

Pr1	*Error in probe in upper part of the boiler*
	Solutions: - Check that the type of probe is in conformity with parameter P0 settings; - Check the probe is intact; - Check the equipment-probe connection; - Check the temperature of the upper part of the boiler. Main consequences: - The equipment stops working.
Pr2	*Error in probe in lower part of the boiler*
	Solutions: - The same as the previous situation but relating to the probe in the lower part of the boiler. Main consequences: - The equipment stops working.
Pr3	*Error in evaporator probe*
	Solutions: - The same as the previous situation but relating to the evaporator probe. - The equipment stops working.

When the cause of the alarm has been removed, the normal operation of the equipment is restored.

7.1.3.13 Defrosting

Defrosting can be enabled in the following way:

• Automatically, when the temperature of the evaporator is below that established in parameter d17 (only if P4 has a value other than 0);

In any case, between one defrosting procedure and another, the compressor must have been left switched on for a period either longer than or equal to d18 minutes. Otherwise the request to enable the defrosting procedure will not be accepted.

If P4 = 1, d2 represents the temperature of the evaporator, above which the defrosting procedure is terminated. Vice versa, if P4 = 0 or P4 = 2, parameter d2 is not taken into consideration.

If during the defrosting procedure the evaporate or probe is above the threshold set by means of parameters d2 and P4 = 1, the request to enable the defrosting procedure is not accepted.

The defrosting procedure consists of three stages:

- Defrosting stage: Parameter d3 establishes the maximum duration of the stage.
  Output status:
  - The compressor is active if d1 = 1,otherwise it is switched off;
  - The defrosting relay is active if d1 = 0 or d1 = 1,otherwise it is switched off;
  - The fans are switched on if d1 = 2, otherwise they are switched off.
- Dripping stage: Parameter d7 establishes the duration of the stage.
  Output status:
  - The compressor is switched off;
  - The defrosting relay is active if d1 = 0 or d1 = 1,otherwise it is switched off; -
    The fans are switched off.
- Drying stage.
  Parameter d16 establishes the duration of the stage.
  Output status:
  - The compressor acts according to parameter d8;
  - The defrosting relay is active if d1 = 0 or d1 = 1,otherwise it is switched off; -
    The fans are switched off.

If the "Anti-Legionella" or the "Overboost" functions are in progress, the defrosting procedure will not be enabled.

7.1.3.14 Day and real time settings

- Make sure that the keyboard is not locked (paragraph 7.1.3.3) and that no other advanced procedure is in progress;
- Press and release the ▲ key: the display will show the first code available;
- Press and release either the ▲ or the ▼ key until "**rtc**" is shown;

The day is displayed as 1...7 (number 1 corresponding to Monday). To change the day of the week:

- Press and release the set key: the display will show "**dd**" followed by the two numbers representing the day;
- Press and release either the ▲ or the ▼ key within 15 seconds.

To change the time:

- Press and release the set key while changing the day of the month: the display will show "**hh**" followed by the two numbers representing the time (Time is shown in the 24 hr. format);
- Press and release either the ▲ or the ▼ key within 15 seconds.

To change the minutes:

- Press and release the set key while changing the time: the display will show "**nn**" followed by the two numbers representing the minutes;
- Press and release either the ▲ or the ▼ key within 15 seconds;
- Press and release the set key or do not carry out any operations for 15 seconds; To exit the procedure:
- Press and release the ⏻ key until the display shows the temperature established by parameter P5 or do not carry out any operations for 60 seconds.

Alternatively:

- Press and release the ⏻ key.

To set operations within timeslots, it is necessary to have carried out the settings relating to the day and the real time before-hand.

7.1.3.15 Configuration parameter settings

To carry out the procedure:

- Make sure that the keyboard is not locked (paragraph 7.1.3.3) and that no other advanced procedure is in progress;
- Keep the ▲ and the ▼ keys pressed for 4 seconds: the display will show "**PA**" (password); • Press and release the set key;
- Press and release either the ▲ or the ▼ key within 15 seconds to set "**-19**" on the display;
- Press and release the set key or do not carry out any other operations for 15 seconds;
- Keep the ▲ and the ▼ keys pressed for 4 seconds: the display will show the first parameter "SP1".

To select a parameter:

- Press and release either the ▲ or the ▼ key.

To change a parameter:

- Press and release the set key;
- Press either the ▲ or the ▼ key to either increase or reduce the parameter value (within 15 seconds);
- Press and release the set key or do not carry out any operations for 15 seconds.

To exit the procedure:

- Keep the ▲ and the ▼ keys pressed for 4 seconds or do not carry out any operations for 60 seconds (any changes will be saved).

Switch the equipment off and then back on again to make the changes made to the parameters effective.

7.1.3.16 Restoring default factory settings

To carry out the procedure:

- Ensure that the keyboard is not locked (paragraph 7.1.3.3) and that no other advanced procedure is in progress;
- Keep the ▲ and the ▼ keys pressed for 4 seconds: the display will show "**PA**" (password); • Press and release the set key;
- Press and release either the ▲ or the ▼ key within 15 seconds to set "**149**";
- Press and release the set key or do not carry out any operations for 15 seconds;
- Keep the ▲ and the ▼ pressed for 4 seconds: the display will show "**dEF**";
- Press and release the set key;
- Press and release either the ▲ or the ▼ within 15 seconds to set "**1**";
- Press and release the set key or do not carry out any other operations for 15 seconds: the display will show "**dEF**" flashing for 4 seconds, after which the equipment will exit the procedure;
- Disconnect the equipment from the mains power supply.

To exit the procedure before its completion:

- Keep the ▲ and the ▼ key pressed for 4 seconds during the procedure (or rather before setting "1": the restoring of default factory settings will not be carried out).

7.1.3.17 TOTAL OF THE COMPRESSOR OPERATING HOURS

7.1.3.17.1 General information

The equipment is capable of memorizing up to 9,999 compressor operating hours, if the number of hours exceeds “9,999” it flashes.

7.1.3.17.2 Display of compressor operating hours

- Make sure that the keyboard is not locked (paragraph 7.1.3.3) and that no other advanced procedure is in progress;
- Press and release the ▲ key: the display will show “Pb1”;
- Press and release either the ▲ or the ▼ key to select “**CH**”; • Press and release the ⏻ key.

To exit the procedure:

- Press and release the set key or do not carry out any other operation for 60 seconds.

Alternatively:

- Press and release the ⏻ key.

7.2 Particular operations

EVHP has a fan speed control system that increases the speed of the same, when the ambient temperature drops to below -1°C, at higher temperatures, the fan maintains a lower speed in order to reducing the noise of the equipment.

The equipment is also provided with a verification system of the environmental conditions concerning the temperatures of the external incoming air. The below described function is necessary to avoid the equipment working with the heat pump mode out of specification, which may cause faults to the compressor and the consequent interruption of the functionality.

By every start, the fan is activated for a time set up by parameter C12 corresponding to 1 minute. After this time, the system measures the incoming air temperature. If the temperature is equal to or lower than parameter SP9 (-7°C), then the conditions for the activation of the heat pump unit are not met, therefore the electric resistance is activated. The heating-up process continues with the help of the electrical resistance until the set point established with the ongoing active cycle is reached.

The system verifies cyclically (every 120 minutes) the environmental conditions and activates the heat pump mode only when these conditions are adequate for its operation.

Parameter description	Code	U.M.	Min	Max	Default	Notes
Password (shadow)	PA				0	Function reserved for specialised technical staff
H2O Set HOT economy cycle	SP1	°C/°F	r3	r4	**55.0**	
H2O Set HOT automatic cycle	SP2	°C/°F	r1	r2	**55.0**	
H2O Set COLD	SP3	°C/°F	10.0	r2	**45.0**	
H2O Set for heat pump stop	SP5	°C/°F	r1	SP2	**62.0**	(**56**°C for L versions)
H2O Set for the enabling of photovoltaic supplement	SP6	°C/°F	40.0	100.0	**75.0**	
H2O Set ANTI-FREEZE	SP7	°C/°F	0	40	**10**	
Set point GREEN cycle	SP8	°C/°F	0	100.0	**40**	
Set cold evaporator	SP9	°C/°F	-25.0	25.0	**-7.0**	
Set damaged evaporator	SP10	°C/°F	-50.0	25.0	**-25.0**	
Upper probe calibration	CA1	°C/°F	-25.0	25.0	**0.0**	
Lower probe calibration	CA2	°C/°F	-25.0	25.0	**0.0**	
Evaporator probe calibration	CA3	°C/°F	-25.0	25.0	**0.0**	
Probe type	P0	----	0	1	**1**	0 = PTC 1 = NTC 2 = PT1000
Decimal point	P1	----	0	1	**1**	1 = Decimal point per Dy(dysprosium) temperature
Unit of measurement	P2	----	0	1	**0**	0 = °C 1 = °F
Function associated with the evaporator probe	P4	----	0	2	**2**	0 = Disabled 1 = Defrosting start-stop 2 = Defrosting start
Local display data	P5	----	0	3	**0**	0 = Upper probe 1 = Operative set point 2 = Lower probe 3 = Evaporator probe
Remote display data	P6	----	0	3	**0**	0 = Upper probe 1 = Operative set point 2 = Lower probe 3 = Evaporator probe

Parameter description	Code	U.M.	Min	Max	Default	Notes
Display data refresh time specified in tenths of a second	P8	1/10 sec	0	250	**5**	
Work set hysteresis	r0	°C/°F	0.1	30.0	**7.0**	
Minimum auto cycle set point	r1	°C/°F	10.0	r2	**40.0**	
Maximum auto cycle set point	r2	°C/°F	r1	100.0	**70.0**	
Minimum economy cycle set point	r3	°C/°F	10.0	r4	**40.0**	
Maximum economy cycle set point	r4	°C/°F	r3	100.0	**62.0**	(**56**°C for L versions)
Work set change block	r5	----	0	1	**0**	1 = It is not possible to change the set point; it can only be seen
Delay in equipment start-up	C0	min	0	240	**5**	Compressor protections
Delay as from last ON	C1	min	0	240	**5**	
Delay as from last OFF	C2	min	0	240	**5**	
Minimum ON time	C3	sec	0	240	**0**	
Number of compressor operating hours required for maintenance	C10	h	0	9999	**1000**	0 = Function excluded
Delay air temperature sample taking for cold evaporator test	C11	min	0	999	**120**	
Minimum delay between fan start-up and compressor activation for incoming air temperature check	C12	min	0	240	**1**	
Timeout GREEN cycle	C13	min	0	240	**20**	
Delay for damaged fan check	C14	min	-1	240	**20**	-1 = disabled function
Type of defrosting	d1	----	0	2	**1**	0 = With heating element 1 = With hot gas 2 = With compressor stopped
Evaporator temperature to conclude defrosting procedure (only if P4=1)	d2	°C/°F	-50.0	50.0	**~~25.0~~**	
Maximum duration of defrosting procedure	d3	min	0	99	**8**	
Automatic defrosting start threshold (evaporator temperature)	d17	°C/°F	-50.0	50.0	**-2.0**	
Minimum compressor start up time to start defrosting procedure	d18	min	0	240	**60**	
Minimum level probe alarm (only AL1 warning)	A0	----	0	2	**0**	0 = Upper probe 1 = Lower probe 2 = Evaporator probe
Minimum alarm set (only AL1 warning)	A1	°C/°F	0.0	50.0	**10.0**	
Type of minimum level alarm delay (only AL1 warning)	A2	----	0	1	**0**	0 = Disabled 1 = Absolute
Maximum level probe alarm (only AH warning)	A3	----	0	2	**0**	0 = Upper probe 1 = Lower probe 2 = Evaporator probe
Maximum alarm set(only AH warning)	A4	°C/°F	0.0	199.0	**90.0**	
Type of maximum level alarm delay (only AH warning)	A5	----	0	1	**0**	0 = Disabled 1 = Absolute
Minimum level AL1 alarm delay due to equipment start-up (only warning)	A6	min	0	240	**120**	
AL1 and AH temperature alarm delays (only warning)	A7	min	0	240	**15**	
Alarm hysteresis	A11	min	0.1	30.0	**2.0**	
Heating element start-up interval (Anti-Legionella)	H0	days	0	99	**30**	
Anti-Legionella function set	H1	°C/°F	10.0	199.0	**70.0**	
Duration of Anti-Legionella function	H3	min	0	240	**2**	
Digital 1 input enabling	i0	----	0	2	**2**	0 = Input disabled 1 = Pressure input 2 = GREEN input
Type of digital 1 input contact	i1	----	0	1	**0**	0 = Active if contact is closed 1= Active if contact is open
High/low pressure end compressor protection	i2	min	0	120	**0**	

Parameter description	Code	U.M.	Min	Max	Default	Notes
Photovoltaic input enabling	i3	----	0	1	**1**	0 = Input disabled 1 = Input enabled
Type of photovoltaic input contact	i4	----	0	1	**0**	0 = Active if contact closed 1 = Active if contact open
Number of digital input alarms per equipment block	i8	----	0	15	**0**	
Time for digital input alarm counter reset	i9	min	1	999	**240**	
Buzzer enabling	u9	----	0	1	**1**	0 = Buzzer disabled 1 = Buzzer enabled
Switching on time for Monday	Hd1	----	1	2	**1**	1 = HOn1-HOF1 2 = HOn2-HOF2
Switching on time for Tuesday	Hd2	----	1	2	**1**	1 = HOn1-HOF1 2 = HOn2-HOF2
Switching on time for Wednesday	Hd3	----	1	2	**1**	1 = HOn1-HOF1 2 = HOn2-HOF2
Switching on time for Thursday	Hd4	----	1	2	**1**	1 = HOn1-HOF1 2 = HOn2-HOF2
Switching on time for Friday	Hd5	----	1	2	**1**	1 = HOn1-HOF1 2 = HOn2-HOF2
Switching on time for Saturday	Hd6	----	1	2	**2**	1 = HOn1-HOF1 2 = HOn2-HOF2
Switching on time for Sunday	Hd7	----	1	2	**2**	1 = HOn1-HOF1 2 = HOn2-HOF2
Time for first switch on timeslot	HOn1	----	00:00	23.59	**--:--**	--:-- = Function excluded
Time for first switch off timeslot	HOF1	----	00:00	23.59	**--:--**	--:-- = Function excluded
Time according to timeslot switch on	HOn2	----	00:00	23.59	**--:--**	--:-- = Function excluded
Time according to timeslot switch off	HOF2	----	00:00	23.59	**--:--**	--:-- = Function excluded
Equipment address	LA	----	1	247	**247**	
Baud Rate	Lb	----	0	3	**2**	0 = 2400 1 = 4800 2 = 9600 3 = 19200
Parity	LP	----	0	2	**2**	0 = NONE 1 = ODD 2 = EVEN
RESERVED	E9	----	0	2	**1**	

8. MAINTENANCE AND CLEANING.

WARNING! Any equipment repair must be performed by qualified personnel. Improper repairs can put the user in serious danger. If your equipment needs to be repaired, please contact the technical assistance service.

WARNING! Before attempting any maintenance operation, make sure that the equipment is not and cannot be accidentally connected to the power supply. Therefore, disconnect the equipment from the mains power supply before carrying out any maintenance or cleaning activities.

8.1 Resetting of safety equipment

The device is equipped with a safety thermostat. When manually reset, the equipment is tripped in case of over-heating.

In order to reset the protection it is necessary to:

- Disconnect the device from the mains power supply;
- Remove any air ducts (see paragraph 5.2);
- Remove the upper cover by undoing the appropriate locking screws (Fig. 17);
- Manually reset the tripped safety thermostat from the top (Fig. 18). In the event of the trip- ping, the central pin of the thermostat sticks out by approxTESYely 4 mm;
- Reassemble the upper cover that was previously removed



Fig. 17 – Removal of upper cover

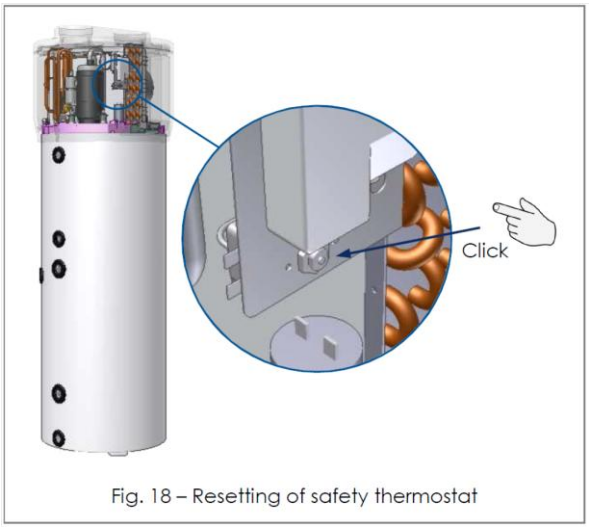


Fig. 18 – Resetting of safety thermostat

WARNING! The tripping of the sfety thermostat can be caused by a fault linked to the control board or by the absence of water inside the tank.

WARNING! Carrying out repair operations on parts that perform safety functions jeopardises the safe operation of the equipment. Substitute the faulty elements only with original spare parts.

N.B.: The intervention of the thermostat excludes the operation of the electric heating elements but not the heat pump system within the permitted operating limits.

8.2 Quarterly inspections

- Visual inspection of the general conditions of the equipment systems as well as the absence of leaks;
- Inspection of the ventilation filter (see paragraph 8.4).

8.3 Annual inspections

- Inspection of the tightness of bolts, nuts, flanges and water supply connections that may have been loosened by vibration;
- Check the state of integrity of the magnesium anodes (see paragraph 8.5).

8.4 Cleaning of the ventilation filter

In the upper part of the equipment there is a ventilation filter. This must be periodically cleaned in order to maintain the perfect efficiency of the system.

After every 1000 hours of operation, the display of the equipment shows the “FiL” alarm that indicates the need to check the cleanliness of the filter.

To remove the filter, it is necessary to grab it with the fingers from the dedicated side opening and pull it outside (Fig. 19).

The filter can be cleaned with rinsing, water gush or slamming. Since the filter is made of stainless steel, it does not need to be periodically substituted.

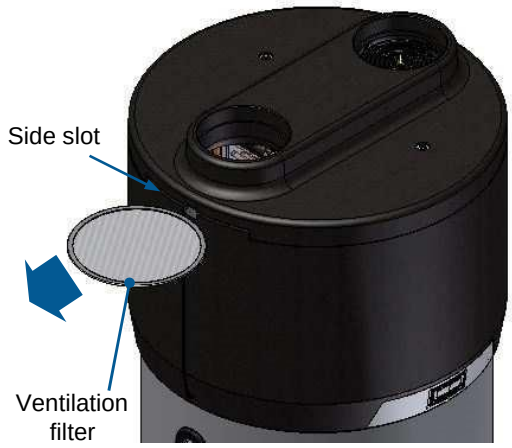


Fig. 19 – Details of the ventilation filter

The filter obstruction reduces the heat pump system performance causing insufficient or even total lack of ventilation

8.5 Magnesium anodes

The magnesium anode (Mg), also called "sacrificial" anode, avoids any parasitic currents that are generated inside the boiler that can trigger corrosion processes on the device surface.
In fact, magnesium is a metal with a lower electrochemical potential when compared to the material that lines the inside of the boiler, therefore it first attracts the negative charges that form with the heating of the water and that cause it to corrode. Therefore, the anode “sacrifices” itself by corroding instead of the tank. The boiler has two anodes, one that has been mounted in the lower part and another in the upper part of the tank (the area that is most subject to corrosion).
The integrity of the magnesium anodes must be checked at least every two years (even better if checked on an annual basis). The operation must be carried out by qualified personnel. Before performing the inspection, it is necessary to: • Close the cold water input supply;

- Empty the water from the boiler (see paragraph 8.5);
- Unscrew the upper anode and check its state of corrosion, if more than 30% of the anode surface is corroded then it is necessary to replace it;
- Carry out the same operation for the lower anode.

The anodes have appropriate sealing gaskets, in order to avoid causing water leaks, it is recommended to use anaerobic sealant for threads compatible for use on sanitary and heating systems. The gaskets must be substituted both in case of inspection as well as the replacement of anodes with new gaskets

8.6. Emptying the boiler

It is advisable to drain the water from inside the boiler if the boiler is idle for a certain period of time, especially in low temperatures.
As for the equipment in question, it is sufficient to disconnect the water supply input connection (see paragraph 5.4).
Alternatively, during the system installation stage, it is advisable to install a drain tapwith a hoseholding connection.

N.B.: It is important to empty the system in case of low temperatures in order to avoid the water freezing.

9. TROUBLESHOOTING

In case of problems of equipment performance, without the occurrence of any of the alarms or errors described in the relative paragraphs, it is advisable to check to see if the problem can be easily solved by checking the possible solutions specified in the table below prior to seeking technical assistance.

Problem	Possible causes
The heat pump does not work	There is no electricity; The plug is not correctly inserted in the socket.
The compressor and/or the fan do not work	The set safety period of time has not finished; The scheduled temperature has been reached.
The heat pump continuously switches itself on and off	Wrong programming of the parameters/setpoint and/or hysteresis values.
The heat pump remains continuously switched on and does not switch off	Wrong programming of the parameters/set point and/or hysteresis values.
The electric heating element does not switch on	Your intervention is not required

WARNING! In the event that the operator does not succeed in solving the problem, switch off the equipment and seek technical assistance specifying the device model purchased.

10. DISPOSAL.

At the end of their device lifecycle, the TESY heat pumps will be disposed of in conformity with the applicable regulations.

WARNING! This equipment contains greenhouse fluorinated gas included in the Kyoto protocol. The maintenance and disposal operations must only be carried out by qualified personnel.

INFORMATION TO USERS

Pursuant to EU Directives 2002/95, 2002/96 and 2003/108, relating to the reduction of the use of hazardous substances in electric and electronic equipment as well as waste disposal ".



The symbol of the barred wheelie bin that can be seen either on the equipment or its packaging indicates that the device must be collected separately from other waste at the end of its lifecycle.

At the end of the device lifecycle, the user must therefore take the equipment to suitable separate collection centers for electronic and electro-technical waste, or to return it to the dealer upon purchasing another equivalent device, at the ratio of one to one.

The adequate separate waste collection relating to the subsequent sending of the discontinued equipment for recycling, treatment and/or environmentally-compatible disposal, contributes towards avoiding possible negative effects on both the environment and health; it also encourages the reuse and/or recycling of materials of which the equipment is made.

The unlawful disposal of the device by the user leads to the application of the administrative penalties foreseen by applicable legislation.

The main materials that are used in the production of the equipment are as follows:

- Steel;
- Magnesium;
- Plastic;
- Copper;
- Aluminum;
- Polyurethane.

11. GUARANTEE.

In the event that the device needs to undergo repairs under guarantee, we advise you to either contact the dealer from whom you have purchased the device or our company. The relative addresses are stated in the catalogues/user manuals of our products as well as on our website. In order to avoid inconveniences, before requesting a repair under guarantee, we advise you to carefully read

11.1 Guarantee

This guarantee covers the product to which it was attached at the moment of purchase.

This product guarantee covers any material or manufacturing defects for a period of TWO YEARS as from the original date of purchase.

In the event that during the course of the guarantee period, material or manufacturing defects should be encountered (at the original date of purchase), we will arrange for the faulty product or its components to be repaired and/or replaced in conformity with the terms and conditions specified below, at no extra charge as regards the costs of labour and spare parts.

The technical assistance service has the right to replace faulty products or their components with new or overhauled products. All replaced products and components will become the property of the MANUFACTURING Company.

11.2 Conditions

- Repairs carried out under guarantee will be performed only if the faulty product is delivered within the guarantee period together with the sales invoice or a purchase receipt (stating the date of purchase, the type of product as well as the name of the dealer). THE MANUFACTURER has the right to refuse repairs to be carried out under guarantee in the absence of the above mentioned documents or in the case in which the information contained in such is either incomplete or illegible. This Guarantee will be terminated in the event that the product model or identification number have been modified, deleted, removed or made illegible.
- This Guarantee does not cover the costs and risks associated with the transport of your product to our COMPANY.
- The following are not covered by this Guarantee:

a) Periodic maintenance operations as well as the repair or replacement of parts due to wear and tear;

b) Consumables (components that will predictably require periodic substitution during the useful life of a product, for example tools, lubricants, filters, etc.).

c) Damage or faults due to improper operation, misuse or mistreatment of the product, for purposes other than normal use;

d) Damage or changes made to the product resulting from:

Misuse, including:

- Treatments causing damage or physical, aesthetic, or superficial alteration;
- Incorrect installation or the use of the product for purposes other than those intended or the
- failure to comply with instructions relating to installation and use;
- Improper maintenance of the product that is not in conformity with the instructions relating to correct maintenance;
- Installation or use of the product that is not in conformity with the current technical or safety regulations of the Country in which the product is installed or used;
- The condition or faults relating to the systems to which the product is connected or inside which it is incorporated;
- Repair operations or attempted repair operations carried out by non-authorized personnel;
- Adaptations or modifications made to the product without obtaining prior written authorization from the manufacturing company, the updating of the product exceeding the specifications and the functions described in the instruction manual, or modifications made to the product in order to make it comply with the national and local safety regulations in countries other than that for which it was specifically designed and produced;

- Negligence;
- Chance events, fires, liquids, chemical substances or those of another nature, flooding, vibration, excessive heat, inadequate ventilation, current surges, excessive or incorrect supply voltage, radiation, electrostatic discharges, including lightening, other external forces and impacts.

11.3 Exclusions and limitations

Except for what is specifically mentioned above, THE MANUFACTURER does not issue any kind of guarantee (of either an explicit, implicit, statutory nature or of any other kind) relating to the product in terms of quality, performance, accuracies, reliability, suitability for a particular use or for any other reason whatsoever.

If this exclusion is not totally or partially permitted by the applicable law, THE MANUFACTURER excludes or limits its guarantees to the maximum limit permitted by the applicable law. Any guarantee that cannot be completely excluded will be limited (within the terms permitted by the applicable law) to the duration of this Guarantee.

THE MANUFACTURER'S only obligation within the framework of this Guarantee consists in the repairing or replacing the products in conformity with the terms and conditions of this guarantee. THE MANUFACTURER will not be held responsible for any loss or damage relating to products, services, this Guarantee or anything else, including economic or intangible loss– the price paid for the product – loss of revenue, income, data, enjoyment or use of the products or other associated products – indirect, incidental or consequential loss or damage. This applies for loss or damage deriving from:

- The jeopardizing of the operation or malfunctioning of the product or associated products following faults or the lack of availability during the permanence upon the MANUFACTURER's premises or other authorized technical assistance centre, with consequent downtime, loss

  of precious time or the interruption of working activities
- Imperfect performance of the product or associated products.

This applies to losses and damage within the framework of any legal theory, including negligence and any other illegal act, breach of contract, explicit or implied guarantees and strict liability (also in the event in which THE MANUFACTURER or the authorized technical assistance has been informed as regards the possibility of such damage).

In cases where the applicable law either prohibits or limits these exemptions of liability, THE MANUFACTURER either excludes or limits its own responsibility to the maximum limit permitted by the applicable law. Other countries, for example, forbid the exclusion or the limitation of damage caused by negligence, gross negligence, intentional noncompliance, fraud and other similar acts. THE MANUFACTURER'S liability within the framework of this guarantee will not exceed the price paid for the product in any case whatsoever, without prejudice to the fact that, in the event that the applicable law should impose higher limits of liability, these limits will be applied.

11.4. Legal rights reserved

Applicable national laws grant the purchasers legal rights (statutory) relating to the sale of consumer products. This guarantee prejudices neither the purchaser's rights established by the applicable laws, nor the rights that cannot be excluded or limited, nor the customer's rights against the dealer. At its sole discretion, the customer may decide to enforce its entitled rights.

12. LIST OF TECHNICAL ASSISTANCE CENTRES

Technical assistance relating to the products is provided by the Local authorised Centres, the addresses of which relating to the specific area are stated in the attachment that completes this manual. The complete, updated list is also available on our websites.



9701 Shumen, Bulgaria, 48 Blvd. Madara | Tel: +359 54 859-111/129/200 | Fax: +359 54 859 130 | www.tesy.com