



Installation and user manual

Domestic Hot Water Heat Pump Monobloc type

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English

EKHH2E200AAV3
EKHH2E260AAV3
EKHH2E260PAAV3

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1 General safety precautions

1.1 About the documentation

- The original documentation is written in English. All other languages are translations.
- The precautions described in this document cover very important topics, follow them carefully.
- The installation of the system, and all activities described in the installation manual must be performed by an authorized installer.

1.1.1 Meaning of warnings and symbols

	DANGER Indicates a situation that results in death or serious injury.
	DANGER: RISK OF ELECTROCUTION Indicates a situation that could result in electrocution.
	DANGER: RISK OF BURNING Indicates a situation that could result in burning because of extreme hot or cold temperatures.
	DANGER: RISK OF EXPLOSION Indicates a situation that could result in explosion.
	WARNING Indicates a situation that could result in death or serious injury.
	WARNING: FLAMMABLE MATERIAL
	CAUTION Indicates a situation that could result in minor or moderate injury.
	NOTICE Indicates a situation that could result in equipment or property damage.



INFORMATION

Indicates useful tips or additional information.

Symbol	Explanation
	Before installation, read the installation and operation manual, and the wiring instruction sheet.
	Before performing maintenance and service tasks, read the service manual.
	For more information, see the installer and user reference guide.

1.2 For the user

- If you are not sure how to operate the unit, contact your installer.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.



WARNING

To prevent electric shocks or fire:

- Do NOT rinse the unit.
- Do NOT operate the unit with wet hands.
- Do NOT place any objects containing water on the unit.



NOTICE

- Do NOT place any objects or equipment on top of the unit.
- Do NOT sit, climb or stand on the unit.

- Units are marked with the following symbol:



This means that electrical and electronic products may not be mixed with unsorted household waste. Do NOT try to dismantle the system yourself: the dismantling of the system, treatment of the refrigerant, of oil and of other parts must be done by an authorized installer and must comply with applicable legislation.

Units must be treated at a specialized treatment facility for reuse, recycling and recovery. By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the

environment and human health. For more information, contact your installer or local authority.

1.3 For the installer

1.3.1 General

If you are not sure how to install or operate the unit, contact your dealer.

	NOTICE Improper installation or attachment of equipment or accessories could result in electric shock, short-circuit, leaks, fire or other damage to the equipment. Only use accessories, optional equipment and spare parts made or approved by Daikin.
	WARNING Make sure installation, testing and applied materials comply with applicable legislation (on top of the instructions described in the Daikin documentation).
	CAUTION Wear adequate personal protective equipment (protective gloves, safety glasses,...) when installing, maintaining or servicing the system.
	DANGER: RISK OF BURNING - Do NOT touch the refrigerant piping, water piping or internal parts during and immediately after operation. It could be too hot or too cold. Give it time to return to normal temperature. If you must touch it, wear protective gloves. - Do NOT touch any accidental leaking refrigerant.
	WARNING Provide adequate measures to prevent that the unit can be used as a shelter by small animals. Small animals that make contact with electrical parts can cause malfunctions, smoke or fire.
	CAUTION Do NOT touch the air inlet or aluminium fins of the unit.
	NOTICE - Do NOT place any objects or equipment on top of the unit. - Do NOT sit, climb or stand on the unit.



NOTICE

Works executed on the outdoor unit are best done under dry weather conditions to avoid water ingress.

In accordance with the applicable legislation, it might be necessary to provide a logbook with the product containing at least: information on maintenance, repair work, results of tests, stand-by periods,...

Also, at least, following information must be provided at an accessible place at the product:

- Instructions for shutting down the system in case of an emergency
- Name and address of fire department, police and hospital
- Name, address and day and night telephone numbers for obtaining service

In Europe, EN378 provides the necessary guidance for this logbook.

1.3.2 Installation site

- Provide sufficient space around the unit for servicing and air circulation.
- Make sure the installation site withstands the unit's weight and vibration.
- Make sure the area is well ventilated. Do NOT block any ventilation openings.
- Make sure the unit is level.

Do NOT install the unit in the following places:

- In potentially explosive atmospheres.
- In places where there is machinery that emits electromagnetic waves. Electromagnetic waves may disturb the control system, and cause malfunction of the equipment.
- In places where there is a risk of fire due to the leakage of flammable gases (example: thinner or gasoline), carbon fibre, ignitable dust.
- In places where corrosive gas (example: sulphurous acid gas) is produced. Corrosion of copper pipes or soldered parts may cause the refrigerant to leak.

1.3.3 Refrigerant

If applicable. See the installation manual of your application for more information.



WARNING

During tests, NEVER pressurize the product with a pressure higher than the maximum allowable pressure (as indicated on the nameplate of the unit).

 **WARNING**

Take sufficient precautions in case of refrigerant leakage. If refrigerant gas leaks, ventilate the area immediately. Possible risks:

- Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.
- Toxic gas may be produced if refrigerant gas comes into contact with fire.

 **DANGER: RISK OF EXPLOSION**

Pump down – Refrigerant leakage. If you want to pump down the system, and there is a leakage in the refrigerant circuit:

- Do NOT use the unit's automatic pump down function, with which you can collect all refrigerant from the system into the outdoor unit. **Possible consequence:** Self-combustion and explosion of the compressor because of air going into the operating compressor.
- Use a separate recovery system so that the unit's compressor does NOT have to operate.

 **WARNING**

Always recover the refrigerant. Do NOT release them directly into the environment. Use a vacuum pump to evacuate the installation.

 **NOTICE**

- To avoid compressor breakdown, do NOT charge more than the specified amount of refrigerant.
- When the refrigerant system is to be opened, refrigerant must be treated according to the applicable legislation.

 **WARNING**

Make sure there is no oxygen in the system. Refrigerant may only be charged after performing the leak test and the vacuum drying.

- In case re-charge is required, refer to the nameplate of the unit. It states the type of refrigerant and necessary amount.
- The unit is factory charged with refrigerant and depending on pipe sizes and pipe lengths some systems require additional charging of refrigerant.
- Only use tools exclusively for the refrigerant type used in the system, this to ensure pressure resistance and prevent foreign materials from entering into the system.
- Charge the liquid refrigerant as follows:

If	Then
A siphon tube is present (i.e., the cylinder is marked with "Liquid filling siphon attached")	Charge with the cylinder upright. 
A siphon tube is NOT present	Charge with the cylinder upside down. 

- Open refrigerant cylinders slowly.
- Charge the refrigerant in liquid form. Adding it in gas form may prevent normal operation.

 **CAUTION**

When the refrigerant charging procedure is done or when pausing, close the valve of the refrigerant tank immediately. If the valve is not closed immediately, remaining pressure might charge additional refrigerant. Possible consequence: Incorrect refrigerant amount.

1.3.4 Water

If applicable. See the installation manual of your application for more information.

 **NOTICE**

Make sure water quality complies with EU directive 98/83 EC.

1.3.5 Electrical

 **DANGER: RISK OF ELECTROCUTION**

- Turn OFF all power supply before removing the switch box cover, connecting electrical wiring or touching electrical parts.
- Disconnect the power supply for more than 1 minute, and measure the voltage at the terminals of main circuit capacitors or electrical components before servicing. The voltage MUST be less than 50 V DC before you can touch electrical components. For the location of the terminals, see the wiring diagram.
- Do NOT touch electrical components with wet hands.
- Do NOT leave the unit unattended when the service cover is removed.

**WARNING**

If NOT factory installed, a main switch or other means for disconnection, having a contact separation in all poles providing full disconnection under overvoltage category III condition, shall be installed in the fixed wiring.

**WARNING**

- ONLY use copper wires.
- Make sure the field wiring complies with the applicable legislation.
- All field wiring must be performed in accordance with the wiring diagram supplied with the product.
- NEVER squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections.
- Make sure to install earth wiring. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earth may cause electrical shock.
- Make sure to use a dedicated power circuit. NEVER use a power supply shared by another appliance.
- Make sure to install the required fuses or circuit breakers;
- Make sure to install an earth leakage protector. Failure to do so may cause electric shock or fire.
- When installing the earth leakage protector, make sure it is compatible with the inverter (resistant to high frequency electric noise) to avoid unnecessary opening of the earth leakage protector.

**WARNING**

- After finishing the electrical work, confirm that each electrical component and terminal inside the electrical components box is connected securely.
- Make sure all covers are closed before starting up the unit.

Install power cables at least 1 metre away from televisions or radios to prevent interference. Depending on the radio waves, a distance of 1 metre may not be sufficient.

**NOTICE**

Precautions when laying power wiring:

- Do not connect wiring of different thicknesses to the power terminal block (slack in the power wiring may cause abnormal heat).
- When connecting wiring which is the same thickness, do as shown in the figure below.



- For wiring, use the designated power wire and connect firmly, then secure to prevent outside pressure being exerted on the terminal board.
- Use an appropriate screwdriver for tightening the terminal screws. A screwdriver with a small head will damage the head and make proper tightening impossible.

1.4 Glossary

Dealer

Sales distributor for the product.

Authorized installer

Technical skilled person who is qualified to install the product.

User

Person who is owner of the product and/or operates the product.

Applicable legislation

All international, European, national and local directives, laws, regulations and/or codes that are relevant and applicable for a certain product or domain.

Service company

Qualified company which can perform or coordinate the required service to the product.

Installation manual

Instruction manual specified for a certain product or application, explaining how to install, configure and maintain it.

Operation manual

Instruction manual specified for a certain product or application, explaining how to operate it.

Accessories

Labels, manuals, information sheets and equipment that are delivered with the product and that need to be installed according to the instructions in the accompanying documentation.

Optional equipment

Equipment made or approved by Daikin that can be combined with the product according to the instructions in the accompanying documentation.

Field supply

Equipment not made by Daikin that can be combined with the product according to the instructions in the accompanying documentation.

2 Introduction

This installation and maintenance manual is to be considered an integral part of the present 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 specialised installer (installers – maintenance technicians) as well as the end user. The installation must 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 5 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

2.1 Products

Dear Customer,

Thank you for having purchased this product.

Our company 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 2012/19/UE and RoHS 2011/65/UE community standards.

2.2 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-compliances 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.

The Supplier shall not be held responsible for damages attributable to misuse, improper use, or as a consequence of unauthorised 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.
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2.3 Copyright

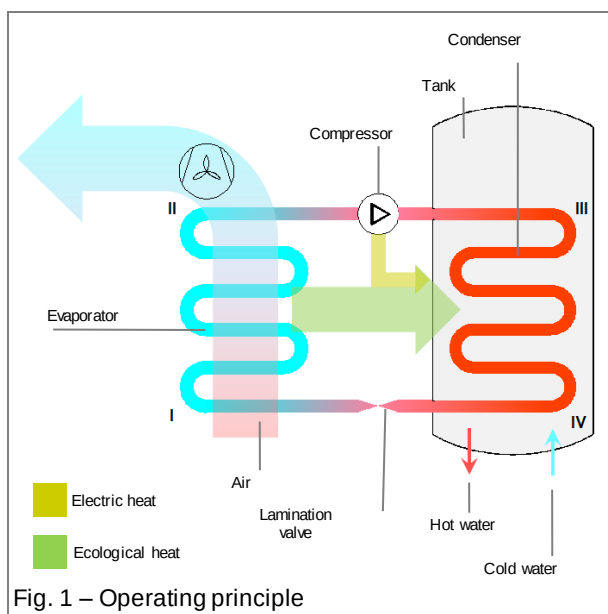
These user instructions contain information protected by copyright. It is forbidden to photocopy, duplicate, translate or record these user instructions on memory equipment, either in whole or in part without prior authorisation of Daikin. Any breaches shall be subject to the payment of compensation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

2.4 Operating principle

The equipment belonging to the 1.9 kW and 2.9 kW 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 lamination 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 "lamination valve" and by losing pressure and the temperature starts to vaporise, it re-enters the evaporator and the cycle starts all over again.



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 its heat by passing over the finned-tube battery of the evaporator;

II-III: The coolant gas passes inside the compressor and it undergoes 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 lamination 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.

2.5 Available versions and configurations

The heat pump is available, in relation to the thermal power (1.9 kW version), which 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
EKHH2E200AAV3 EKHH2E260AAV3	Air source heat pump for the production of domestic hot water
EKHH2E260PAAV3	Air source heat pump for the production of domestic hot water suitable for use with the solar power system.

3 Handling and transport

The equipment is supplied in a cardboard box (*). It is fastened to a pallet with three screws.

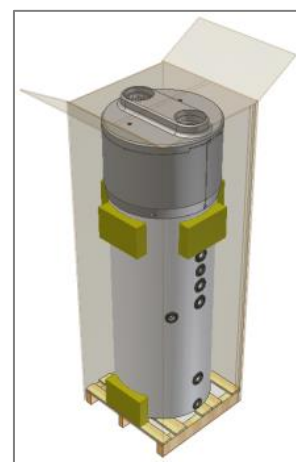
Use a fork-lift truck or a pallet truck in order to unload the equipment: it is opportune for these to have a load capacity of at least 250 Kg.

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 authorised technical staff.

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



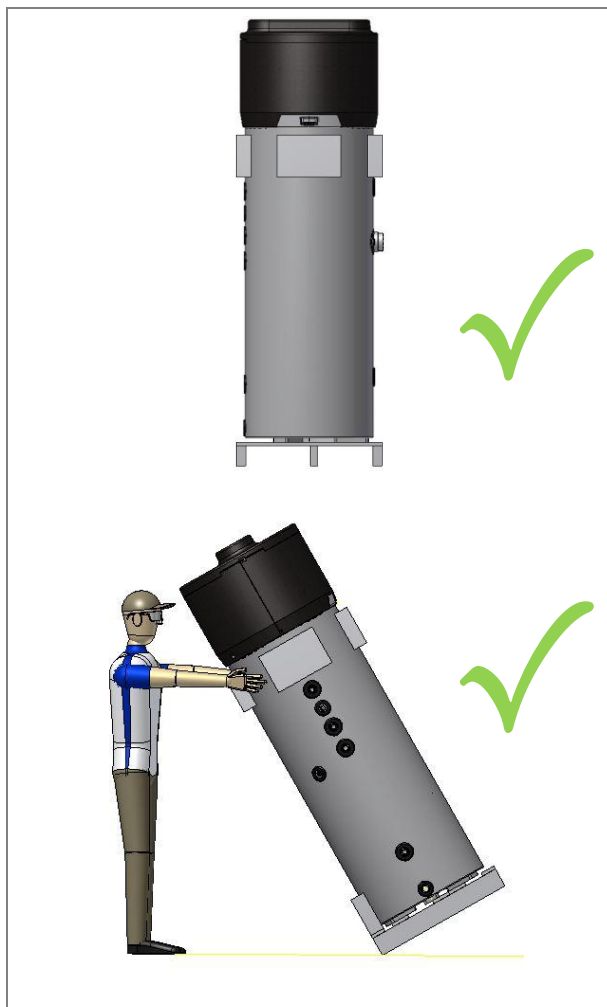
WARNING!

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

(*) Note: at Daikin'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:



WARNING!

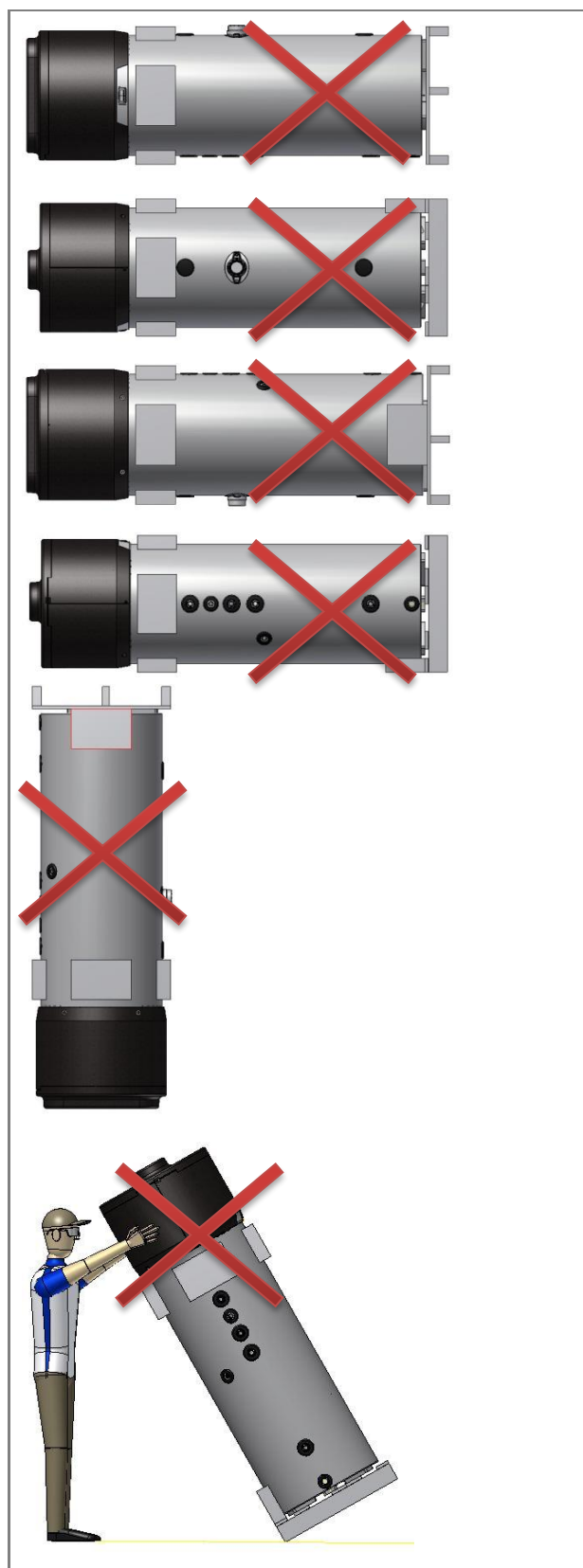
During the product handling and installation stages, it is forbidden to put the upper part of the device under any kind of stress whatsoever due to the fact that it is not of a structural nature.



WARNING!

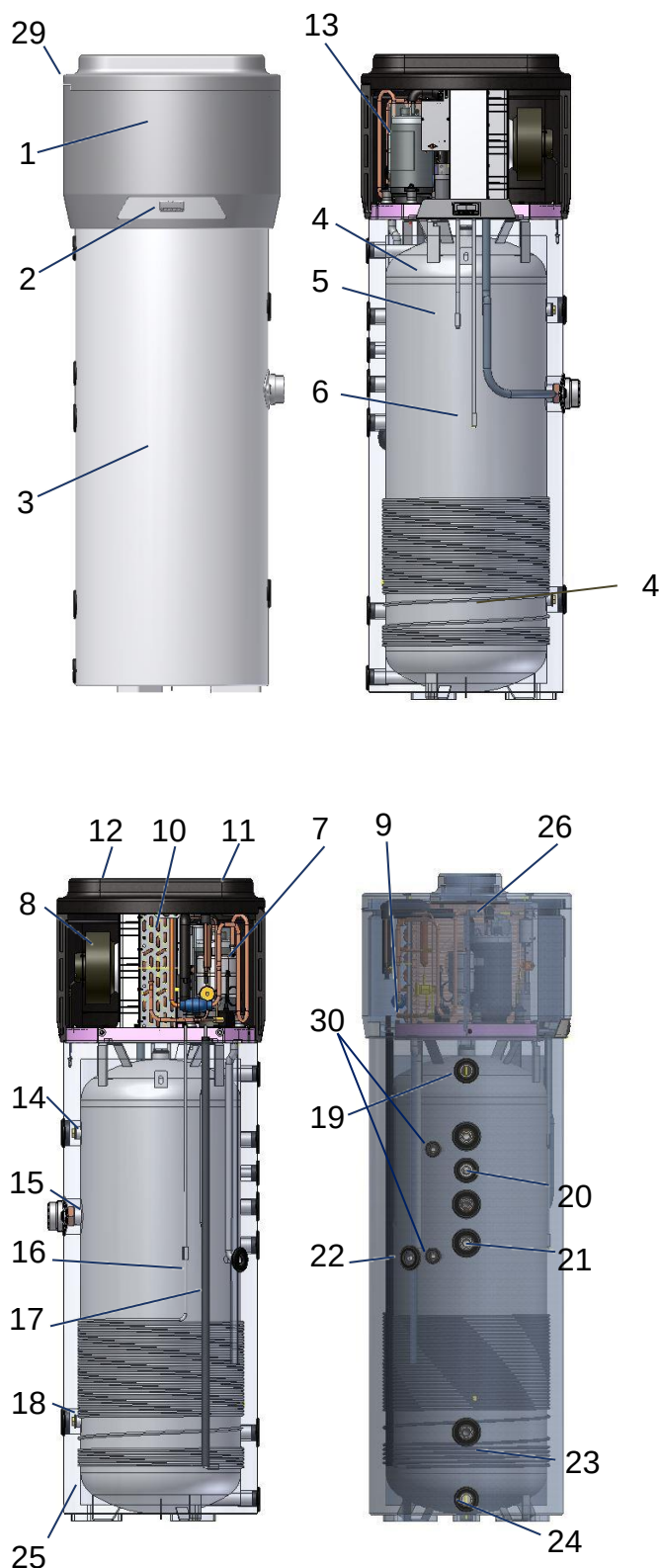
The equipment can be transported horizontally only during the last km according to what indicated above (see "Positions permitted for transporting and handling") and taking care of positioning some supports on the lower side of the boiler in order not to lean against the upper part, which is not of a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

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



4 Construction characteristics

1	Heat pump.
2	Control panel.
3	Enclosure in embossed ABS.
4	Steel tank (boiler) enamelled according to UNI standards (capacity: 200; 260 litres).
5	Upper boiler probe.
6	Lower boiler probe.
7	Coolant recharge.
8	Ambient air recirculation fan.
9	Lamination valve.
10	High-efficiency finned evaporator. The quantity of fluid put into this is regulated by an appropriate thermostatic valve.
11	Air inlet ($\varnothing$ 160 mm).
12	Air outlet ($\varnothing$ 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 3/4").
21	Inlet, coil fitting for solar thermal power system (G 1 1/4", 1 m ² exchange surface).
22	Condensate 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.
29	Air inlet filter.
30	1/2" G fitting for probe immersion sleeve



4.1 Technical characteristics

	1.9 kW			
Descriptions	u.m.	EKHH2E200AAV3	EKHH2E260AAV3	EKHH2E260PAAV3
HP thermal power yield	kW	1.82	1.82	1.82
Total thermal power	kW	3.4	3.4	3.4
Heating time (¹)	h:m	8:17	10:14	10:14
Heating time in BOOST mode (¹)	h:m	3:58	5:06	5:06
Thermal losses (²)	W	60	70	71
Electrical data				
Power supply	V	1/N/230		
Frequency	Hz	50		
Degree of protection			IPX4	
HP maximum absorption	kW	0.53	0.53	0.53
Average absorption	kW	0.43	0.43	0.43
Heating element + HP maximum absorption	kW	2.03	2.03	2.03
Electric heating element power	kW	1.5	1.5	1.5
Maximum current in HP	A	2.4	2.4	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	56	56
Maximum settable temperature in an AUTOMATIC cycle	°C	70	70	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	120		
Motor protection		Internal thermal circuit breaker with automatic reset		
Condenser		Wrapped externally, not in contact with water		
Coolant		R134a		
Load	g	900	900	900
Water storage				
Water storage nominal capacity	l	199	255	248
Max. quantity of hot water that can be used V _{max} ⁽³⁾	l	276	342	342
Coil for connection to solar thermal power system	m ²	N/A	N/A	1.0 m ²
Cathodic protection		Mg Anode Ø26x400 mm	1 x Mg anode Ø26x250 mm + 1 x Mg anode Ø26x250 mm	1 x Mg anode Ø26x250 mm + 1 x Mg anode Ø26x400 mm
Insulation		50 mm high-density polyurethane foam		
Defrosting		Active with Hot Gas valve		
Dimensions	mm	H1707xD600xD _{max} 650	H2000xD600xD _{max} 650	H2000xD600xD _{max} 650
Transport weight	Kg	95	98.6	115.2
Sound power indoors L _w (A) ⁽⁴⁾	dB(A)	53	53	53
Automatic anti-Legionella disinfection cycle ⁽⁵⁾		YES	YES	YES
Maximum working pressure	Bar	7	7	7
⁽¹⁾ temperature of incoming air supply 7°C (6°C), temperature of boiler storage environment 20°C, water heated from 10°C to 55°C, (according to UNI EN 16147-2011) ⁽²⁾ measurements carried out according to UNI EN 12897-2006 ⁽³⁾ measurements carried out according to UNI EN 16147-2011 ⁽⁴⁾ measurements carried out according to EN 12102-2013 ⁽⁵⁾ automatic activation every 30 days of operation				

5 Important information

5.1 Conformity with European regulations

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

- 2011/65/UE Directive on the restrictions of use of certain hazardous substances in electric and electronic equipment (RoHS);
- Directive 2014/30/UE - Electromagnetic compatibility (EMC);
- Directive 2014/35/UE – Low Voltage Directive (LVD)
- Directive 2009/125/CE Ecodesign Requirements.

5.2 Degrees of protection provided by enclosures

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

5.3 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.
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	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!
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5.4 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.

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. Daikin 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.
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	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.
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	N.B. During the design and construction stage of the systems, current local rules and provisions are complied with.
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5.5 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.

5.6 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.

	N.B. Maintenance and disposal operations must be carried out only by qualified personnel.
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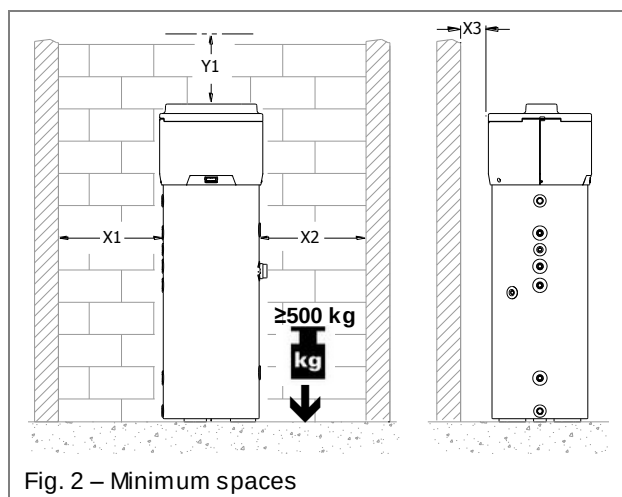
6 Installation and connections

	WARNING! Installation, commissioning and maintenance of the device must be performed by qualified and authorised personnel. Do not attempt to install the device yourself.
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6.1 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.



Model	X1	X2	X3	Y1
	mm	mm	mm	mm
EKHH2E200AAV3 EKHH2E260AAV3 EKHH2E260PAV3	650	650	200	300

Moreover, the premises must:

- Have adequate water and power supplylines;
- 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 m³;
- Be frost-proof and dry.



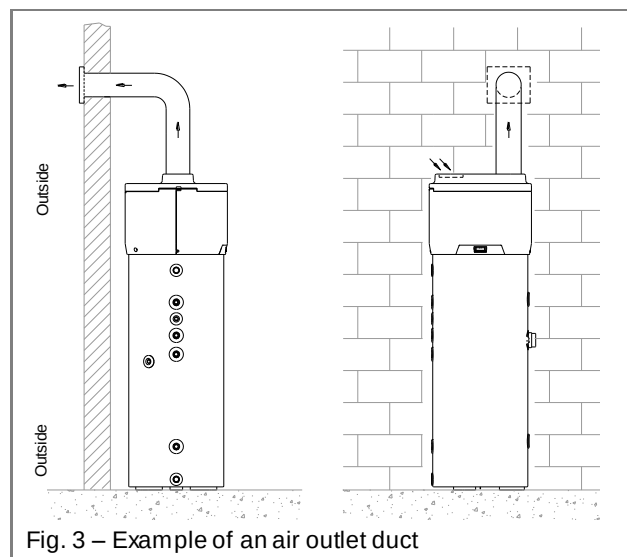
WARNING!

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

6.2 Ventilation connection

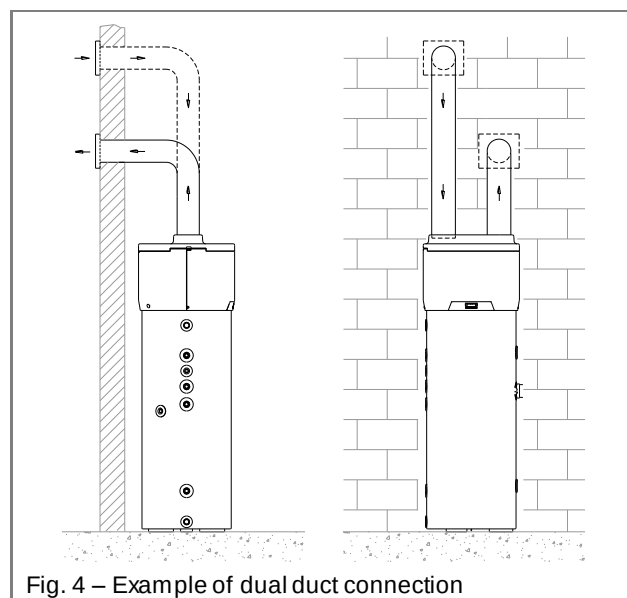
Apart from the space indicated in paragraph 6.1, the heat pump requires adequate ventilation.

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



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 and Fig. 5): this consists of a second duct that draws air in from outside instead of directly from inside the premises.



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;
- It doesn't exceed the maximum suggested length of 6 meters (with 2 elbow junctions 90°).
- The maximum total allowable pressure drop for all components, including through holes for mounting on external wall, within the pipe system does not exceed 120 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.

6.2.1 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 "B") with the aim of directing the air flow either towards the inside (Fig. 5a) or the outside of the home (Fig. 5b).

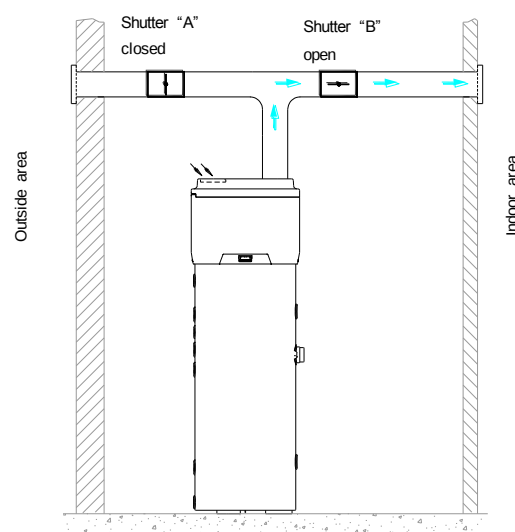


Fig. 5a – Example of installation in summer

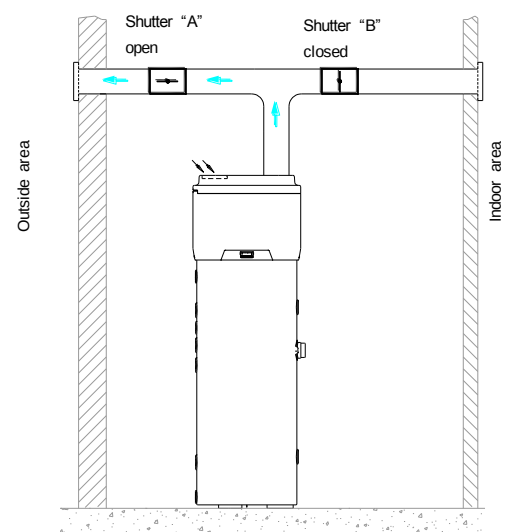


Fig. 5b – Example of installation in winter

6.3 Device mounting and connection

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

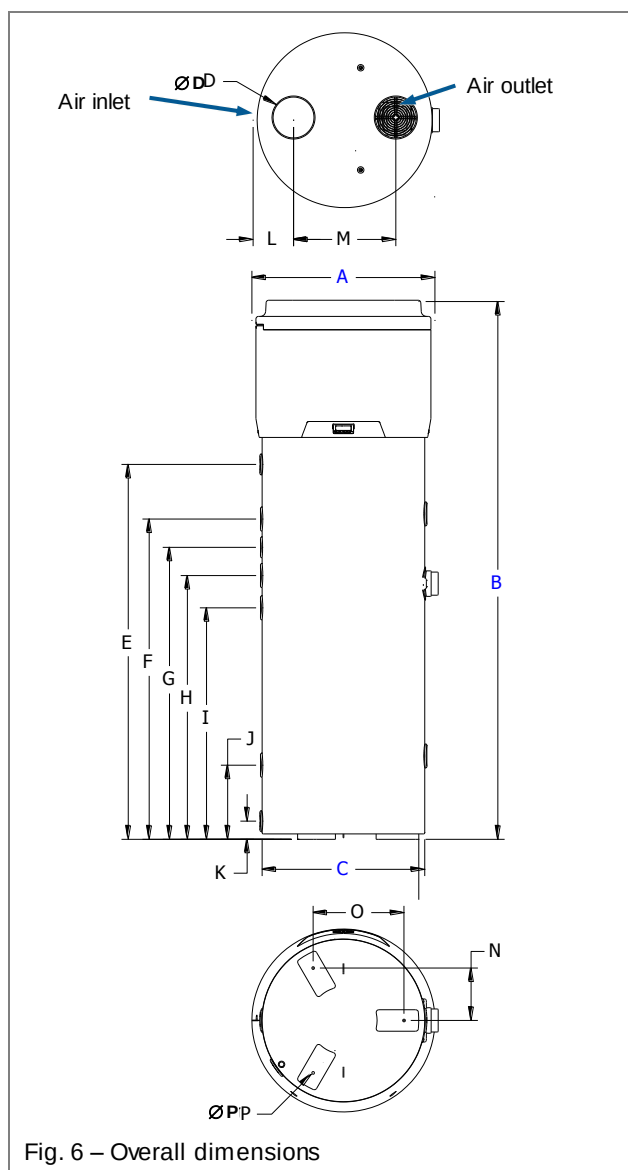


Fig. 6 – Overall dimensions

(260l versions)	A	B	C	ØD	E	F	G
	mm	mm	mm	mm	mm	mm	mm
	650	2000	600	160	1391	1190	1085
	H	I	J	K	L	M	N
	mm	mm	mm	mm	mm	mm	mm
	980	860	275	70	150	380	195
	O	ØP	Q	R			
	mm	mm	mm	mm			
	337,5	10	850				

(200l versions)	A	B	C	ØD	E	F	G
	mm	mm	mm	mm	mm	mm	mm
	650	1504 1714	600	160	891 1101		670 795
	H	I	J	K	L	M	N
	mm	mm	mm	mm	mm	mm	mm
	/	590	275	70	150	380	195
	O	ØP	Q	R			
	mm	mm	mm	mm			
	337,5	10	535 560				

6.4 Water supply connections

Connect the cold water inlet and the outlet pipes to the appropriate connection points (Fig.7).

The table below shows the characteristics of the connection points.

Pos.	Description	Connection/hole
①	Cold water inlet pipe	G 1"
②	Hot water outlet pipe	G 1"
③	Condensate drain	G ½"
④	Recirculation pipe	G ¾"
⑤	Coil for solar thermal power	G 1" 1/4
⑥	Probe immersion sleeve (only in models provided with it)	½"G

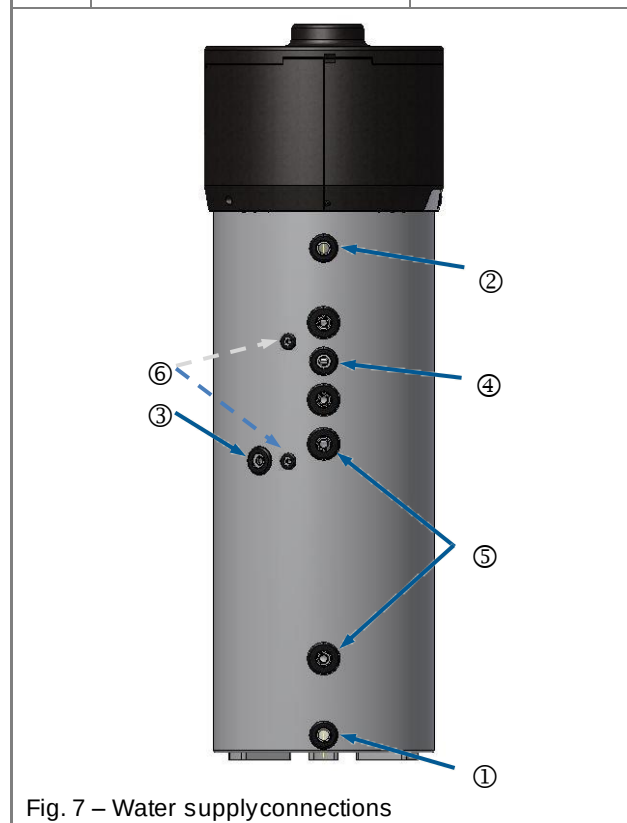
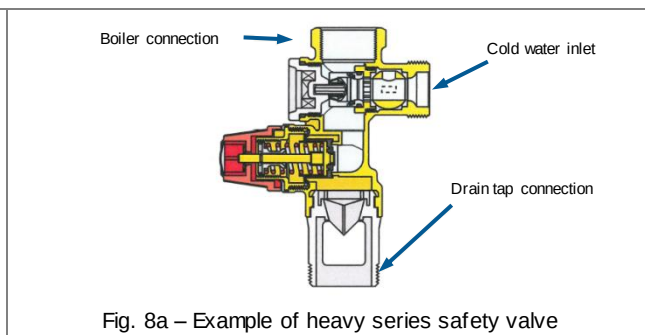
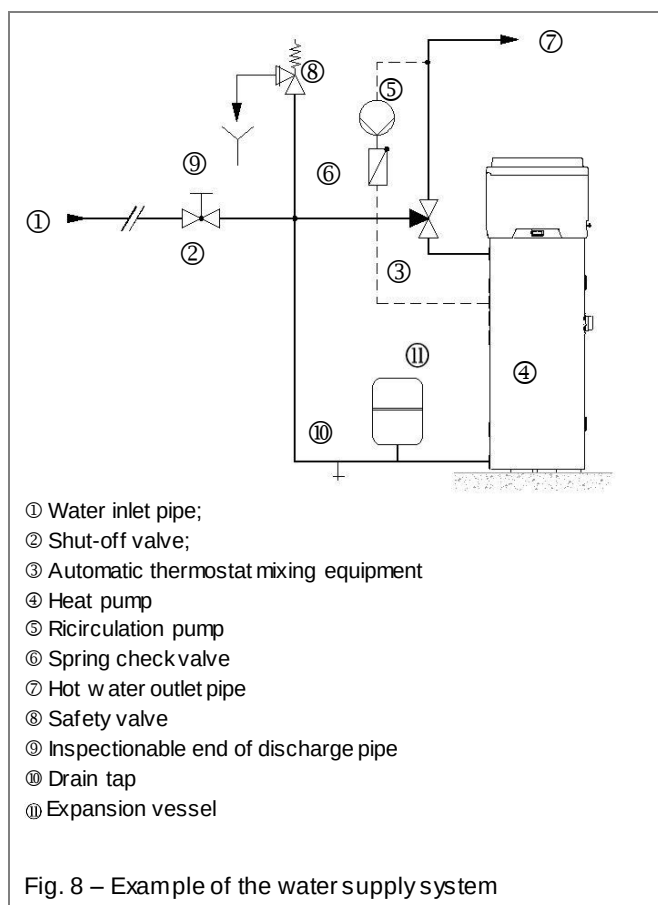


Fig. 7 – Water supply connections

The following illustration (Fig. 8) shows an example of a water supply connection.



! **N.B.**
 The safety equipment for protection against over pressure must be operated 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 overpressure 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 production 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 water pipe (Fig. 8).

! **N.B.**
 It is compulsory to install a dirt filter on the cold water inlet pipe. The equipment should not work with water hardness lower than 12°F; on the contrary, 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).

6.4.1 Condensate 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. 9a or Fig. 9b).

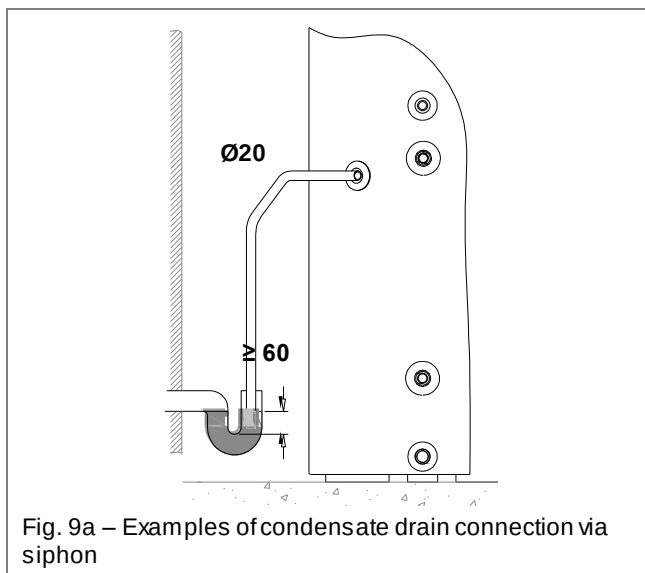


Fig. 9a – Examples of condensate drain connection via siphon

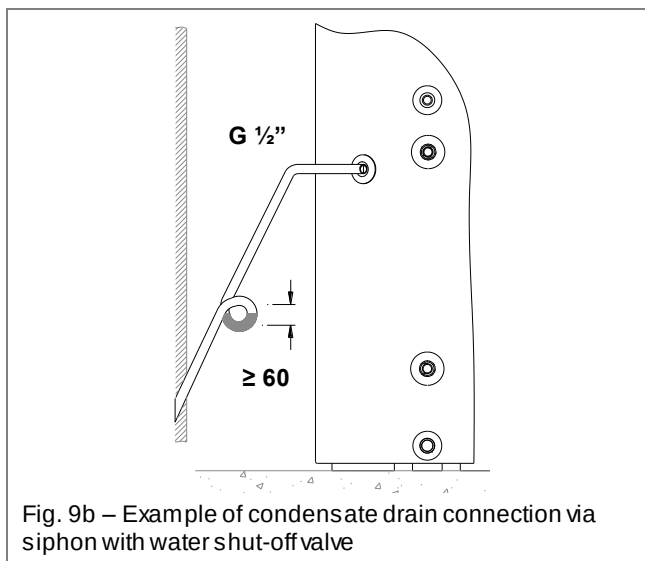


Fig. 9b – Example of condensate drain connection via siphon with water shut-off valve

6.5 Solar power system integration

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

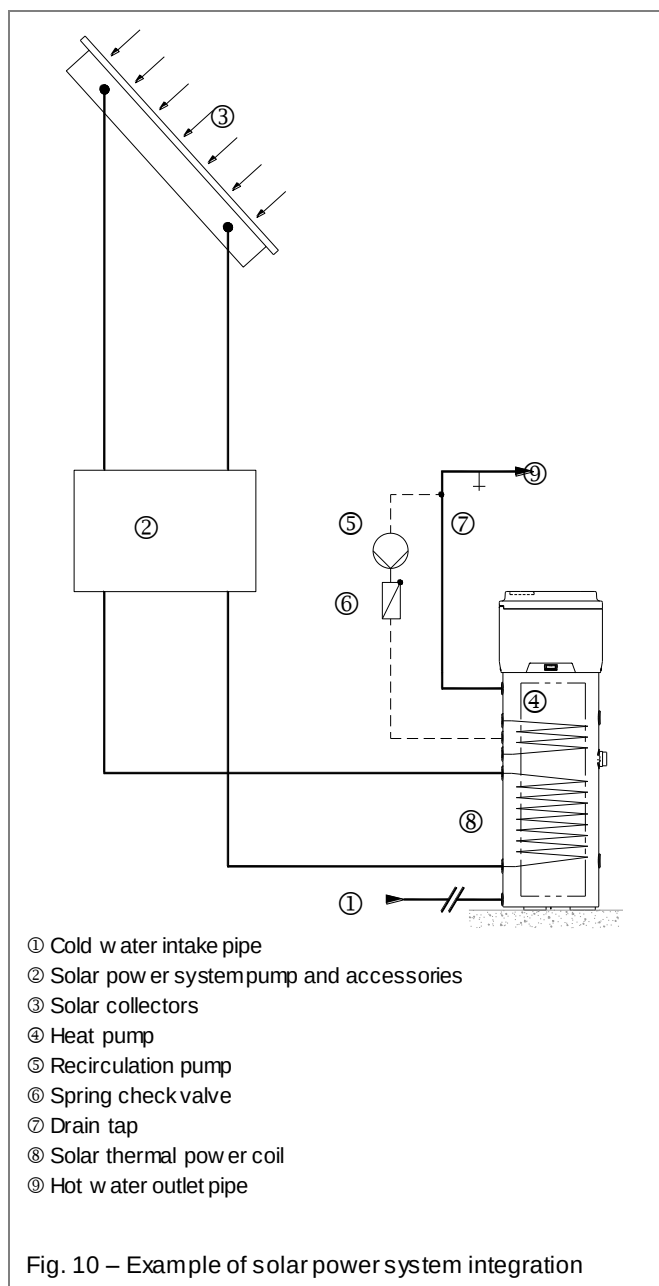


Fig. 10 – Example of solar power system integration

6.6 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.
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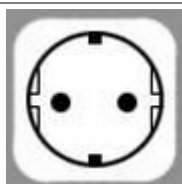


Fig. 11 – A Schuko socket

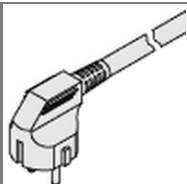


Fig. 12 – Equipment plug

6.6.1 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 1: Input from the solar thermal power system.** When a free contact is established between terminals 30 and 31 (cable: brown/yellow) and the water temperature measured by lower probe is higher than SP8, the heat pump stops and water is heated up by the solar panels; the heat pump starts again when the contact is released and time set by C13 is passed or immediately if the lower probe temperature is lower than SP8.
- Digital 2: Input from photovoltaic system.** When a free contact is established between terminals 31 and 32 (cable: green/white) and the heat pump reaches the SP5 temperature (default setting 62°C), the hot water nominal temperature is raised by 7°C. It is possible to change the SP6 parameter (e.g.: raising the temperature from 62°C to 70°C) so that, if there is enough PV electrical energy, the heat drop from 62°C to 70°C is made by the immersion electric heating element (if SP6 is the same as SP5, the electric heating element will never activate).

6.6.1.1 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. 14). 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. 13a).

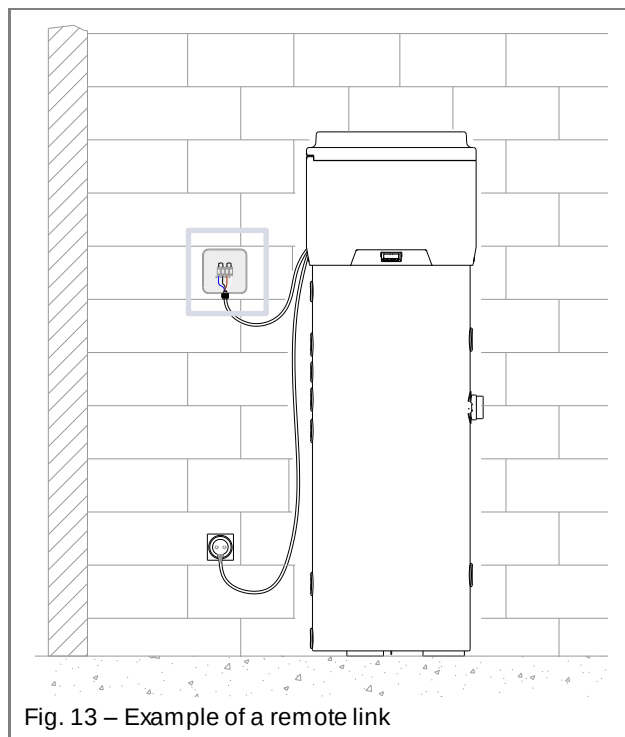


Fig. 13 – Example of a remote link

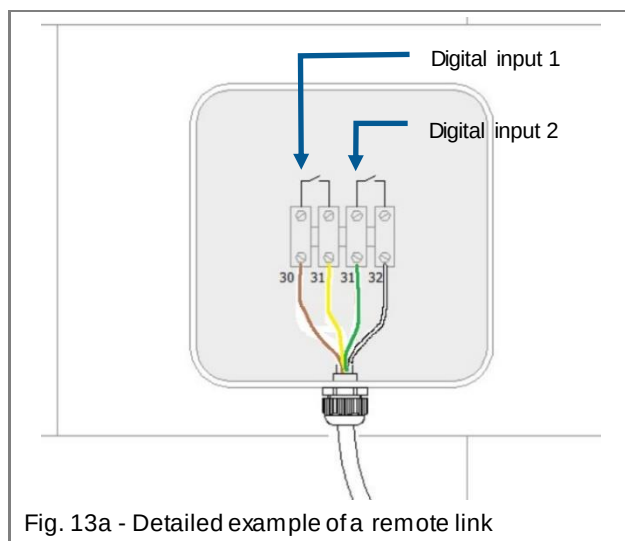
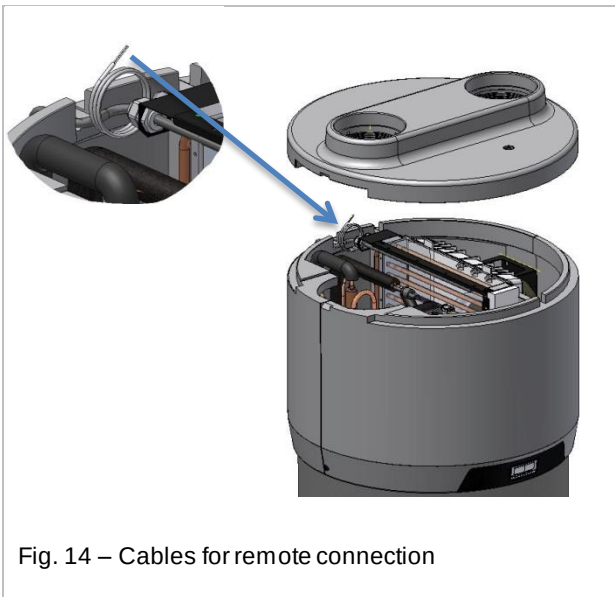
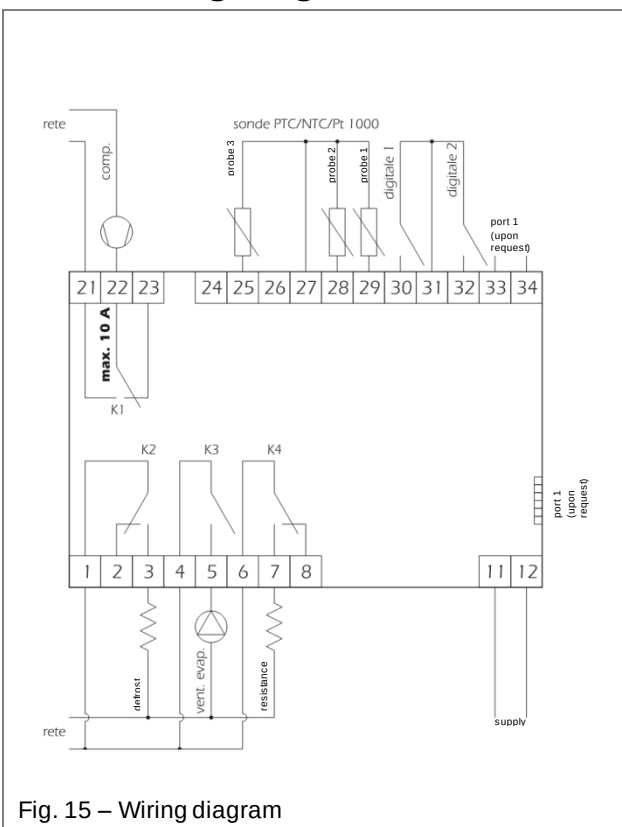


Fig. 13a - Detailed example of a remote link

To access the 4-core cable for remote connection it is necessary to remove the upper cover of the boiler (see paragraph 9.1 Fig. 18), and take the cable outside through the dedicated opening, that is already present on the back cover, as indicated in Fig. 14.



6.7 Wiring diagram



7 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 stand-by, the display remains switched off, the power key is illuminated;
- Press the power key (see paragraph [□](#)), the equipment starts up in the "ECO" mode (default setting) 5 minutes after pressing the key.

8 Operation and use

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".

8.1 The User Interface

The user interface (Fig. 16) 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.

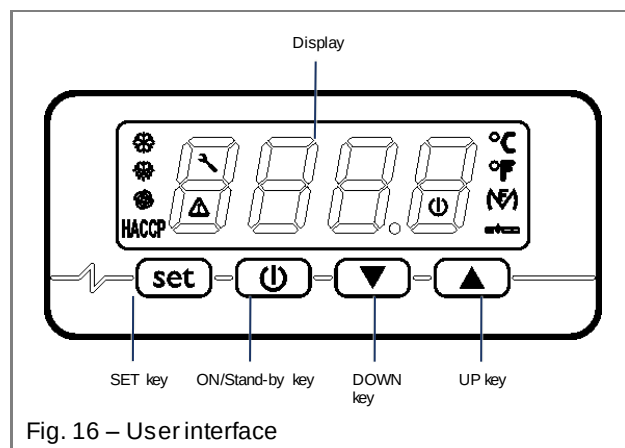


Fig. 16 – User interface

8.1.1 Interface keys and display

8.1.1.1 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.
---	--

8.1.1.2 The [SET] key

By means of this key it is possible to:

- Confirm set choices or values.

8.1.1.3 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.

8.1.1.4 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.

8.1.1.5 The Interface Display

The interface display (Fig. 17) makes it possible to visualise:

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



Fig. 17 – User interface display

	Compressor LED	If this is lit: the compressor is active. If 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
	Degree Fahrenheit 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

8.1.1.6 Warnings

Loc	The keyboard is locked (see paragraph 8.1.3.3).
dEFr	The defrosting procedure is in progress and it is not possible to enable other functions
Anti	The “Anti-Legionella” function is in progress.
ObSt	The “Overboost” function is in progress.
ECO	The “Economy” function is in progress.

Auto	The “Automatic” function is in progress.
------	--

8.1.2 Operating logic

8.1.2.1 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 SP5 parameter 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 lower than SP3 parameter. 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 60°C. This function is periodically and, in any case, automatically enabled every 30 days, 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 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.

8.1.3 Basic management

8.1.3.1 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 8.1.3.6).



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



If the keyboard has been locked (paragraph 8.1.3.3) 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.

8.1.3.2 Change of operating mode (AUTOMATIC, ECONOMY and OVERBOOST)

8.1.3.2.1 AUTOMATIC operating mode

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

- Make sure that the keyboard is not locked (paragraph 8.1.3.3) and that no other advanced procedure is in progress;
- Press per the  key for 1 second, "Auto" starts to flash;
- Press the  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.

8.1.3.2.2 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 8.1.3.3), 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  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.

8.1.3.2.3 OVERBOOST operating mode

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

- Make sure that the keyboard is not locked (paragraph 8.1.3.3) 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  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.

8.1.3.3 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.

8.1.3.4 Temperature setting in the ECO operating mode (SP1)

- Make sure that the keyboard is not locked (paragraph 8.1.3.3) and that no other advanced procedure is in progress;
- Press and release the  key: "SP1" will be shown on the display;
- Press and release the  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).

8.1.3.5 Temperature setting in the Automatic mode (SP2)

- Make sure that the keyboard is not locked (paragraph 8.1.3.3) 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).

8.1.3.6 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 8.1.3.14.

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.

8.1.3.7 Display of the operating status

- Make sure that the keyboard is not locked (paragraph 8.1.3.3) 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.

8.1.3.8 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.



N.B.

The following instructions are reserved for specialised technical assistance personnel.

8.1.3.9 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 < SP3 and upper probe < SP3. Once a temperature exceeding SP3 has been detected, the Overboost operating mode terminates and the previously set operative mode is restored.

8.1.3.10 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.

8.1.3.11 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 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	<i>Minimum temperature alarm</i>
	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	<i>Maximum temperature alarm</i>
	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; i8 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.
---	---

8.1.3.12 Error messages

Pr1	<i>Error in probe in upper part of the boiler</i> 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	<i>Error in probe in lower part of the boiler</i> 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	<i>Error in evaporator probe</i> 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.
---	--

8.1.3.13 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.

8.1.3.14 Day and real time settings

- Make sure that the keyboard is not locked (paragraph 8.1.3.3) 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  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  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 beforehand.

8.1.3.15 Configuration parameter settings

To carry out the procedure:

- Make sure that the keyboard is not locked (paragraph 8.1.3.3) 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.

8.1.3.16 Restoring default factory settings

To carry out the procedure:

- Ensure that the keyboard is not locked (paragraph 8.1.3.3) 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).

8.1.3.17 TOTAL OF THE COMPRESSOR OPERATING HOURS

8.1.3.17.1 General information

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

8.1.3.17.2 Display of compressor operating hours

- Make sure that the keyboard is not locked (paragraph 8.1.3.3) 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.

8.2 Particular operations

The product 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.

8.2.1 List of equipment parameters

Parameter description	Code	U.M.	Min	Max	Default	Notes
Password (shadow)	PA				0	Function reserved for specialised technical staff
H2O Set HOT economycycle	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 heatpump stop	SP5	°C/°F	r1	70.0	62.0	
H2O Set for the enabling of photovoltaic supplement	SP6	°C/°F	40.0	100.0	62.0	
H2O Set ANTI-FREEZE	SP7	°C/°F	0	40	10	
Set point solar thermal 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	2.0	
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 = Display decimal point per 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 setpoint 2 = Lower probe 3 = Evaporator probe
Remote display data	P6	----	0	3	0	0 = Upper probe 1 = Operative setpoint 2 = Lower probe 3 = Evaporator probe
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 economycycle set point	r3	°C/°F	10.0	r4	40.0	
Maximum economycycle set point	r4	°C/°F	r3	100.0	56.0	

Parameter description	Code	U.M.	Min	Max	Default	Notes
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 solar thermal 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	3.0	
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	

Parameter description	Code	U.M.	Min	Max	Default	Notes
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	60.0	
Duration of Anti-Legionella function	H3	min	0	240	2	
Solar thermal input enabling (Digital 1)	i0	----	0	2	2	0 = Input disabled 1 = Pressure input 2 = Digital 1 input
Type of solar thermal 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	
Photovoltaic input enabling (Digital 2)	i3	----	0	1	1	0 = Input disabled 1 = Input enabled
Type of photovoltaic input contact (Digital 2)	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

Parameter description	Code	U.M.	Min	Max	Default	Notes
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	0	

9 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.

9.1 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 6.2);
- Remove the upper cover by undoing the appropriate locking screws (Fig. 18);
- Manually reset the tripped safety thermostat from the top (Fig. 19). In the event of the tripping, the central pin of the thermostat sticks out by approximately 4 mm;
- Reassemble the upper cover that was previously removed.



Fig. 18 – Removal of upper cover

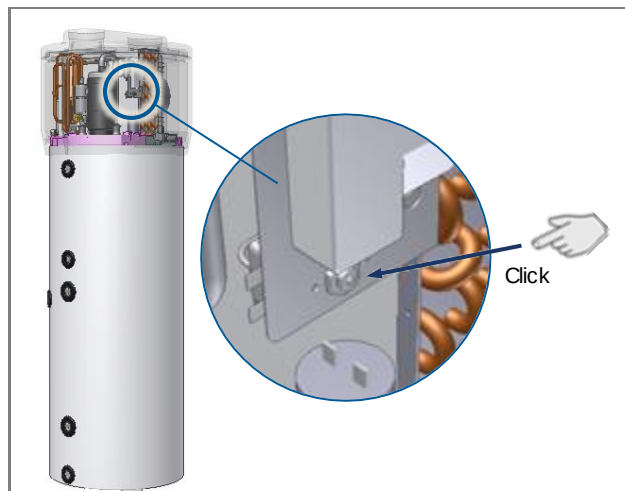


Fig. 19 – Resetting of safety thermostat



WARNING!

The tripping of the safety 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.

9.2 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 9.4).

9.3 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 9.5).

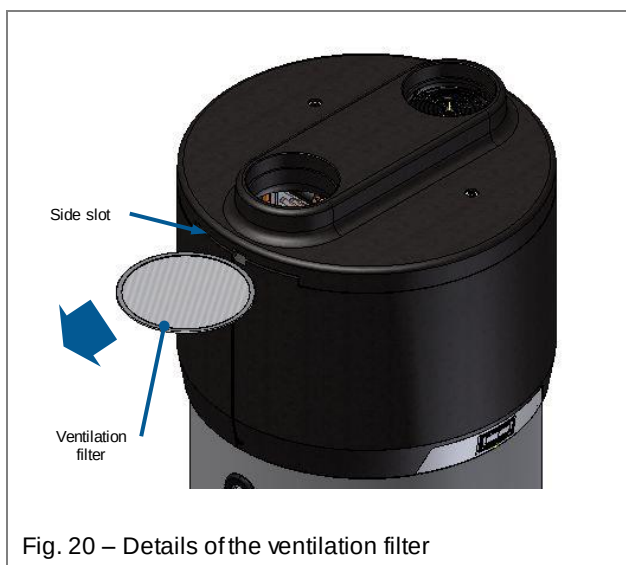
9.4 Cleaning of the ventilation filter

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. 20).

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.



N.B.

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

9.5 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 9.6);
- 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.

9.6 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 6.4).

Alternatively, during the system installation stage, it is advisable to install a drain tap with a hose-holding connection.



N.B.

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

10 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.

11 Disposal

At the end of their device lifecycle, the 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 Directives 2011/65/EU and 2012/19/EU, 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 centres 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;
- Aluminium;
- Polyurethane.

12 Product fiche

Descriptions	u.m.	EKHH2E200AAV3	EKHH2E260AAV3	EKHH2E260PAAV3
Declared load profile		L	XL	
Water heating energy efficiency class under average climate conditions		A+		
Water heating energy efficiency in % under average climate conditions	%	123	127	127
Annual electricity consumption in kWh under average climate conditions	kWh	835	1323	1323
Thermostat temperature settings of the water heater	°C	55		
Sound power level Lwa indoors in dB	dB	53		
The water heater is able to work only during off-peak hours		NO		
Any specific precautions that shall be taken when the water heater is assembled, installed or maintained		See manual		
Water heating energy efficiency in % under colder climate conditions	%	94	92	92
Water heating energy efficiency in % under warmer climate conditions	%	135	129	129
Annual electricity consumption in kWh under colder climate conditions	kWh	1091	1826	1826
Annual electricity consumption in kWh under warmer climate conditions	kWh	756	1296	1296
Sound power level Lwa outdoors in dB	dB	52		

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