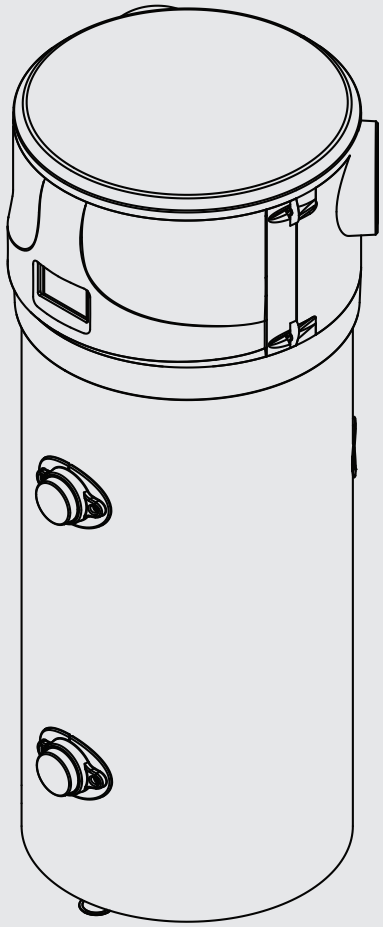
User Manual
(original instruction)

EN



Panasonic®

20xxxx_N1 – Rev.00 – 05/2025

Domestic Hot Water Heat Pump

P-DHW**AE5
P-DHW**CAE5

Dear Customer,

Thank you for having purchased this product.

The Panasonic, 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 WEEE – RoHS (2011/65/EU and 2012/19/EU community standards.

Panasonic Corporation

Markings

The English text is the original instructions. Other languages are translation of the original instructions.

TABLE OF CONTENTS

1. INTRODUCTION

This installation and maintenance manual are to be considered an integral part of the heat pump (hereafter referred to as equipment).
The manual must be kept 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 related 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 quickly find the most important information:

	**INFORMATION ON SAFETY** (High risk warning in **bold text** / Low risk warning in plain text)
	**PROHIBITION** Refers to prohibited actions.
	**PROCEDURES TO FOLLOW**
	**INFORMATION/ SUGGESTIONS**

1.1 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.

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

⚠ This product must be installed by the sales dealer or installer.

⚠ This product is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons or equivalent.

⚠ Select a installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

⚠ In case of malfunction of this appliance, do not repair by yourself in order to prevent electrical, mechanical and other risks. Contact the sales dealer or service dealer for a repair.

⚠ It may need two or more people to carry out the installation work.

⚠ Do not insert fingers or other objects into the indoor and outdoor units.

⚠ This product is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

⚠ This product 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 product. Cleaning and user maintenance shall not be made by children without supervision.

⚠ (For European market only) This product 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 product in a safe way and understand the hazards involved. Children shall not play with the product. Cleaning and user maintenance shall not be made by children without supervision.

1.2 Copyright

Panasonic. 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.

1.3 Operating principle

The equipment 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.

The equipment uses circuit consisting of a compressor, an evaporator, a condenser and a expansion 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 "expansion valve" and by losing pressure and the temperature starts to vaporize, 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 valve. It undergoes a sudden drop in both pressure and temperature and it partially vaporizes bringing pressure and temperature back to the initial conditions. The thermodynamic cycle can re-start.

Position designation on Fig. 1

1	Condenser	**III**	Hot gas
2	Compressor	**IV**	Warm liquid
3	Electronic expansion valve	**V**	Fresh air in
4	Evaporator	**VI**	Cold and dry air out
I	Cold liquid	**HW**	Domestic hot water
II	Warm gas	**CW**	Inlet cold water

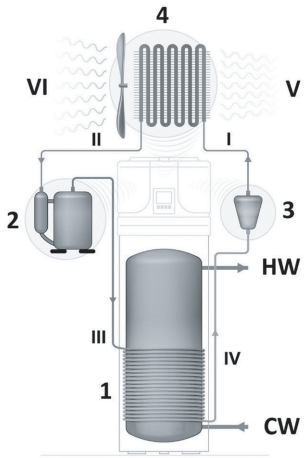


Fig. 1

1.4 Available versions and configurations

The heat pump is available in two different versions, in relation to the hot water volume (with or without additional heat exchanger). 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
P-DHW200/260AE5	Air source heat pump for the production of domestic hot water
P-DHW200/260CAE5	Air source heat pump for the production of domestic hot water suitable for use with the solar power system or additional heating unit.

2. TRANSPORT AND HANDLING

2.1 Transport and handling

⚠ While handling, do not catch the unit onto upper decorative panels! There is a risk to damage them!

⚠ Equipment is delivered on an individual transport pallet. During the transport the appliance must be in an upright position designated by the label stick on the carton box.

⛔ Transporting the unit in any other positions is strictly prohibited.

⚠ For a transport over short distance (provided that it is done with care), an inclination angle up to 30 degrees is permitted

⚠ It is advised that the maximum permissible inclination angle of 45 degree is not exceeded. If transport in an inclined position cannot be avoided, the unit should be taken into operation one hour after it has been moved into final position.

⚠ 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 200 Kg.

⛔ For the entire period in which the equipment remains idle, waiting to be used, it is opportune to protect it from atmospheric agents. **Positions not permitted** for transporting, handling and storage are shown in Fig. 3 and 11.

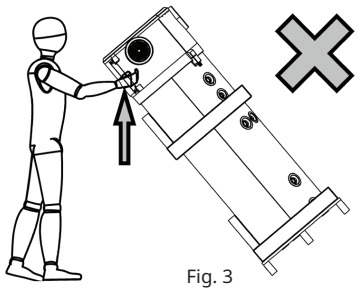


Fig. 3

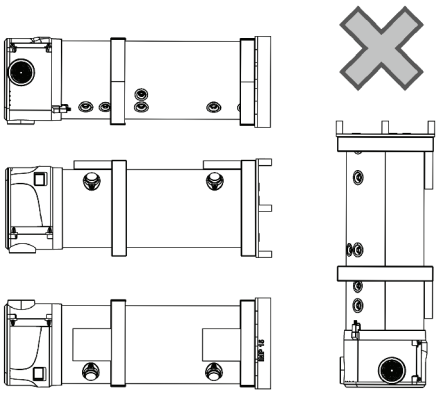


Fig. 11

2.2 Handling

⚠ **While handling, do not catch the unit onto upper plastic panels! There is a risk to damage them! The correct way of handling the unit is shown on Fig. 4**

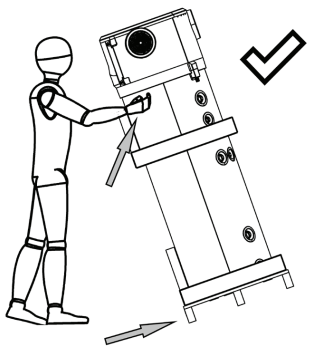


Fig. 4

2.3 Unpacking

The unpacking operations must be carried out carefully so as not to damage the appliance.

Please follow the described steps bellow (Fig.2):

- Using a cutter, cut the straps of carton box.
- Pull upwards the cartoon box.

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.

Please follow the described steps bellow in order to mount three supports:

- Incline the appliance as per Fig. 5.
- Unscrew the three bolts which hold the pallet to the water heater; Fig. 6
- Mount the adjustable feet directly to the appliance; * Fig. 7
- Put the storage tank in vertical position and adjust the level using the feet Fig. 9. During this operation keep the damages. Fig. 9
- when the appliance is in a vertical position and the points described above are fulfilled - please check whether the appliance is levelling from 1° to 3° towards the condense drainage. For this purpose the installer must have a leveling tool available.

*If the adjustment feet are delivered in separate parts you can assemble them as follows (Fig. 8):

- put the part 1 on bolt 2 which is unscrewed from the pallet
- put the washer 3 which is removed from the pallet
- Screw on the nuts 4 which are delivered with the appliances
- Fix the unit to the floor as per Fig. 10. Use brackets supplied with the appliance.

⚠ The water heater must (in compliance with Article 20 of Standard EN 60335-1) be fixed to the

⚠ ground using the fixing bracket provided for this purpose according to Fig 10.

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

⚠ **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.**

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

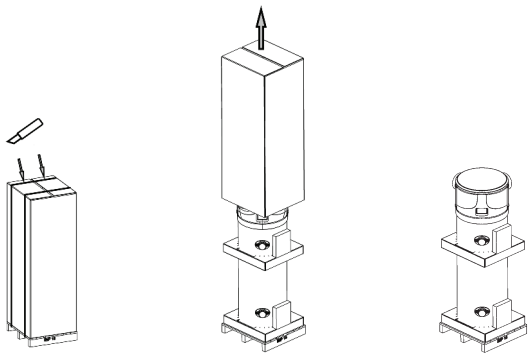


Fig. 2

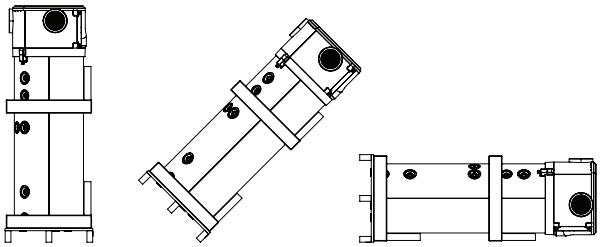


Fig. 5

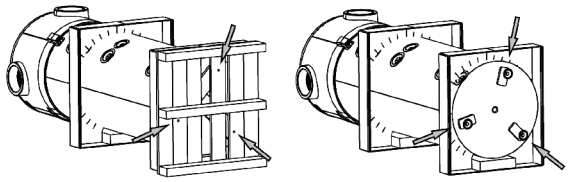


Fig. 6 Fig. 7

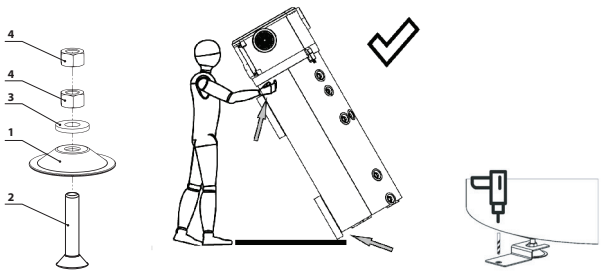


Fig. 8 Fig. 9 Fig. 10

3. DESIGN CHARACTERISTICS

3.1 Design characteristics

See Fig. 12, 14, 15:

No.	Description	No.	Description
1	Heat pump unit	26	Back panel - outlet
2	Control panel	27	Front panel
3	External PS jacket	28	Lower panel
4	Enameled storage tank	29	Microchannel condenser
5	Top tank temperature “TTT”	30	Protective fan grid
6	Bottom sensor temperature “BTT”	31	Ambient air température sensor “AT”
7	Charge pipe	32	Return gas temperature sensor “SUT”
8	Fan elbow	33	Evaporator(coil) temperature sensor “CT”
9	Electronically regulated expansion valve	34	Exhaust temperature sensor “ET”
10	High-efficiency finned evaporator	35	Plastic cap
11	Air outlet (Ø 160 mm)	36	Self-tapping screw
12	Air inlet (Ø 160 mm)	37	Sleeve washers pvc 1/2 TS
13	Hermetically-sealed rotary compressor	38	Sleeve washers pvc 3/4“ R
14	(1.5 kW – 230 W) El. heater	39	Sleeve washers pvc 1“ HW-IS-OS
15	Condenser outlet line - liquid	52	Sleeve washers pvc 1“ CW
16	Condenser inlet line – hot gas	40	Safety Thermostat
17	Replaceable magnesium anode.	41	Filter refrigarant
18	50 mm polyurethane insulation	42	Fan Motor
19	High pressure switch – automatic reset	43	Control panel fixing bracket
21	Controller box	44	Screw for EPP
23	2-way defrosting valve	45	Power cord with plug
24	Upper cover	46	Main PCB
25	Back panel - inlet	47	Capacitor Compressor
		53	EMI filter

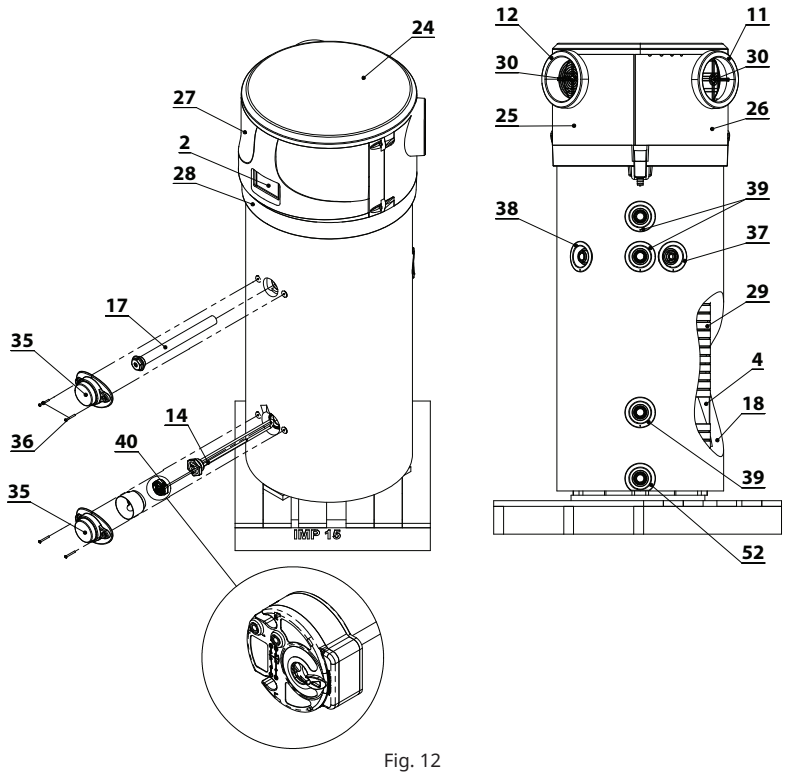


Fig. 12

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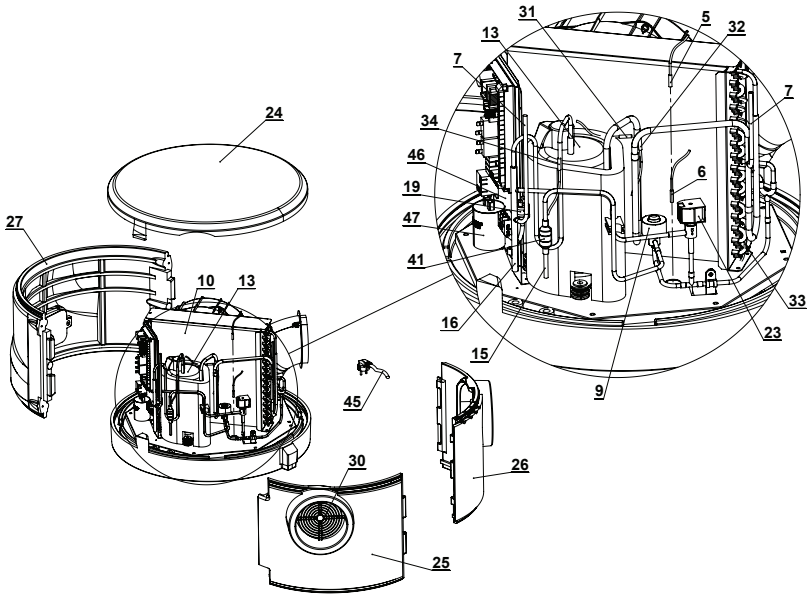
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Fig. 14

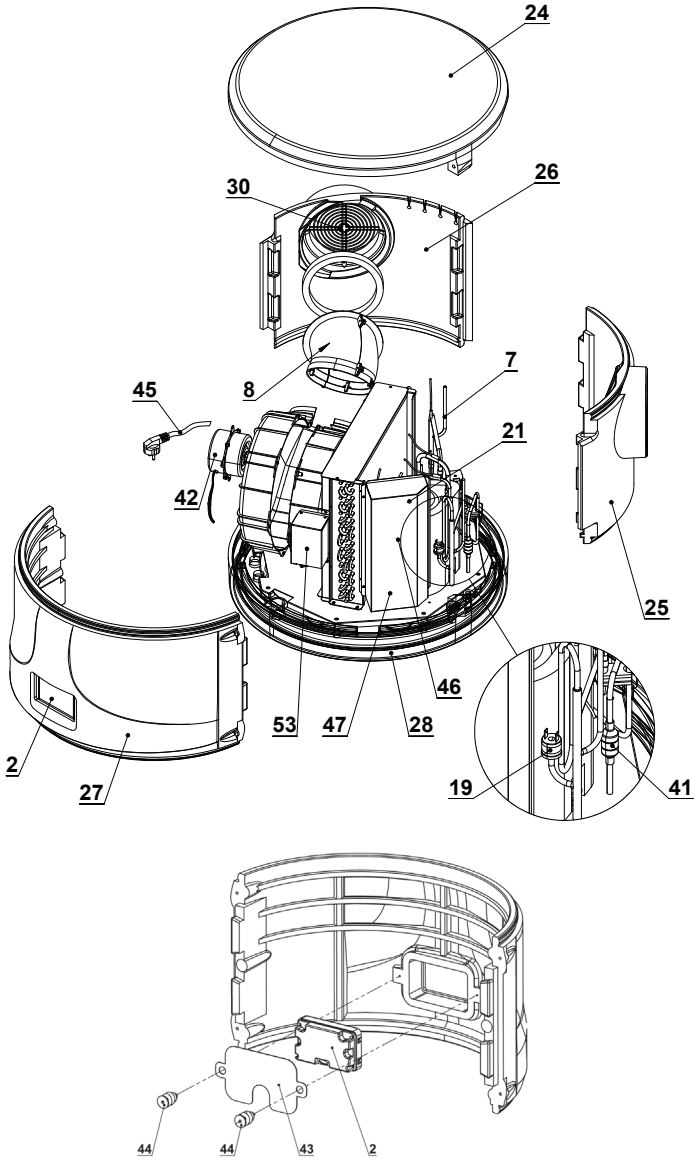
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Fig. 15

Descriptions		P-DHW260CAE5	P-DHW260AE5	P-DHW200CAE5	P-DHW200AE5
Performance data acc. EN16147:2017					
Load profile		XL	XL	L	L
Hot water temperature set point	°C	55	55	55	55
Heating up time; th					
· (EN 16147:2017 - A14/W55)	h:m	9:37	9:20	7:11	7:24
· (EN 16147:2017 - A7/W55)		10:27	10:24	7:38	7:47
· (EN 16147:2017 – A2/W55)		14:45	14:35	11:14	11:21
Heating up time in BOOST mode (A7/W10-55)	h:m	4:55	4:39	3:39	3:43
Average heat pump power consumption at initial heat up Weh-HP / th					
· (EN 16147:2017 - A14/W55)	kW	3.203	3.203	2.534	2.505
· (EN 16147:2017 - A7/W55)		3.545	3.486	2.625	2.703
· (EN 16147:2017 – A2/W55)		4.795	4.552	3.587	3.621
Power consumption, standby period; Pes					
· (EN 16147:2017 - A14)	kW	0.027	0.027	0.028	0.028
· (EN 16147:2017 - A7)		0.035	0.034	0.031	0.028
· (EN 16147:2017 – A2)		0.035	0.032	0.031	0.028
Daily electrical energy consumption; Qelec					
· (EN 16147:2017 - A14)	kW	5.072	5.045	3.229	3.274
· (EN 16147:2017 - A7)		5.475	5.467	3.498	3.508
· (EN 16147:2017 – A2)		6.835	6.786	4.432	4.467
COP DHW;					
· (EN 16147:2017 - A14/W55)	-	3.8	3.8	3.6	3.6
· (EN 16147:2017 - A7/W55)		3.5	3.5	3.4	3.4
· (EN 16147:2017 – A2/W55)		2.8	2.8	2.6	2.6
Water heating energy efficiency; ηWH / ErP class					
· (EN 16147:2017 - A14/W55)	%	154 / A+	155 / A++	150 / A++	150 / A++
· (EN 16147:2017 - A7/W55)		145 / A+	146 / A+	140 / A+	139 / A+
· (EN 16147:2017 – A2/W55)		114 / A	115 / A	108 / A	108 / A
Annual electrical energy consumption; AEC					
· (EN 16147:2017 - A14/W55)	kWh/a	1094	1085	679	684
· (EN 16147:2017 - A7/W55)		1160	1152	731	736
· (EN 16147:2017 – A2/W55)		1459	1452	935	947
Maximum volume of mixed water at 40°C	I	348	359	266.6	278.3
Reference hot water temperature; θ'WH	°C	54.5	54.3	50.6	54
Rated heat output; P rated					
· (EN 16147:2017 - A14/W55)	kW	1.26	1.34	1.29	1.27
· (EN 16147:2017 - A7/W55)		1.23	1.2	1.22	1.25
· (EN 16147:2017 – A2/W55)		0.82	0.86	0.86	0.86
Electrical data					
Power supply	V	1/N/220-240			
Frequency	Hz	50			
Degree of protection		IPX4			

Descriptions		P-DHW260CAE5	P-DHW260AE5	P-DHW200CAE5	P-DHW200AE5
HP maximum power consumption	kW	0.470+1,500 (e-heater) = 1,970			
Electric heating element power	kW	1.5			
Maximum current of appliance	A	2.5+6.5 (e-heater) = 9.0			
Max. starting current of heat pump	A	13.5			
Required overload protections	A	16A T fuse/ 16A automatic switch, characteristic C (to be expected during installation on power supply systems)			
Internal thermal protection		Safety thermostat with manual reset			
Operating conditions					
Min.÷ max temperature heat pump air intake (90% R.H.)	°C	-7 ÷ 43			
Min. ÷ max temperature installation site	°C	4 ÷ 40			
Working temperature					
Max. settable water temperature [with E-heater] (EN 16147:2017)	°C	75			
Compressor		Rotary			
Compressor protection		Thermal circuit breaker with automatic reset			
Automatic safety pressure switch (high)	MPa	3.2			
Automatic safety pressure switch (low)	MPa	0.2			
Fan		Centrifugal			
Available external pressure of heat pump	Pa	88			
Ejection outlet diameter	mm	160			
Nominal air capacity	m^3/h	360			
Motor protection		Internal thermal circuit breaker with automatic reset			
Condenser		Aluminium; wrapped externally, not in contact with water			
Refrigerant		R290			
Refrigerant charge	g	150			
Global warming potential of the refrigerant		3			
CO2 equivalent (CO2e)	t	0			
Defrosting		Active with "2-way valve"			
Sound emission data; EN12102:2013					
Sound power Lw(A) indoor	dB(A)	50			
Sound power Lw(A) outdoor		56			
Sound pressure level at 1 m		34			
Automatic anti-Legionella cycle		YES			
Water storage tank					
Water storage capacity	l	251	260	194	202
Solar heat exchanger surface	m2	1.05	n.a.	1.05	n.a.
Solar heat exchanger volume	l	6.4	n.a.	6.4	n.a.
Corrosion protection		Mg anode Ø33x400 mm			
Thermal insulation		50 mm rigid PU			
Maximum working pressure – storage tank	Bar	8			
Transport weight	Kg	127.3	112.8	110.8	96.3

*The output data refers to new appliances with clean heat exchangers!!!

4. IMPORTANT INFORMATION

4.1 Conformity with European regulations

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

- 012/19/EU Directive on waste electrical and electronic equipment (WEEE);
- 2011/65/EU Directive on the restrictions of use of certain hazardous substances in electric and electronic equipment (RoHS);
- Directive 2014/30/EU – Electromagnetic compatibility (EMC);
- Directive 2014/35/EU – Low Voltage Directive (LVD);
- Directive 2009/125/EC – Eco design Requirements for Energy-related products.

4.2 Degree of protection provided by enclosures

4.2.1 Preliminary warnings

⚠ On receipt check for any damage and, if any is found, accept the goods with reservation, and keep photographic evidence of any damage found

⚠ In the event of damage, notify the shipper within 3 days of receipt of any damage by registered mail with return receipt, submitting photographic evidence. Similar information should be sent by email to the manufacturer (jurisdiction will be at the Court Trento for any dispute).

⚠ No notice of damage will be accepted after 3 days from delivery.

⚠ Unpack and check the contents of individual components against the packing list.

4.2.2 Package description

The packaging is made of suitable material and carried out by experienced personnel.
All units are checked and tested and are delivered complete and in perfect condition.
The appliance is shipped in standard packaging consisting of a cardboard sleeve and a set of expanded polystyrene protectors.

4.3 Limitations of use

⚠ **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.**

❗ 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.

The equipment can only be installed and started up for the intended use within closed heating systems in conformity with the EN 12828:2012 standard.

⚠ 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.

⚠ 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.

❗ 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 does not contain fluorinated greenhouse gas included in the Kyoto protocol. Do not discard this gas into the environment.

Refrigerant type: R290
GWP(1) value: 3
(1) GWP = global warming potential
Periodical inspections for refrigerant leaks may be required depending on European or local legislation. Please contact your local dealer for more information.
Carefully handle the liquid refrigerant, as it may cause a frostbite.

5. INSTALLATION AND CONNECTION

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

⚠ **Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.**

⚠ **The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance to an operating electric heater.**

⚠ **Do not pierce or burn.**

⚠ **Be aware that refrigerants may not contain an odour.**

5.1 Requirements to the installation room / area

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 the necessary working space by referring to the dimensions, shown in Fig. 16.

The appliance must be installed in accordance with the normal trade practices and in compliance with the national legislation (EU electricity directives and regulations concerning special installations and places of operation including bathrooms, shower cabins HD60364-7-701(IEC 60364-7-701:2006)).

The premises (room Fig.16) 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);
- Be frost-proof and dry (room temperature >4°C);
- The product must be installed in a room where the ambient temperature must not exceed 35°C;
- Have a ground floor with bearing capacity of at least 500 kg/m^2;
- Provide possibility for the appliance to be vertically installed or with small incline backwards: 1 ... 3° see Fig. 20

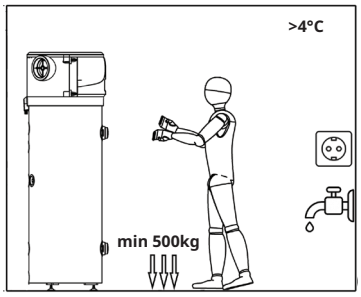


Fig. 16

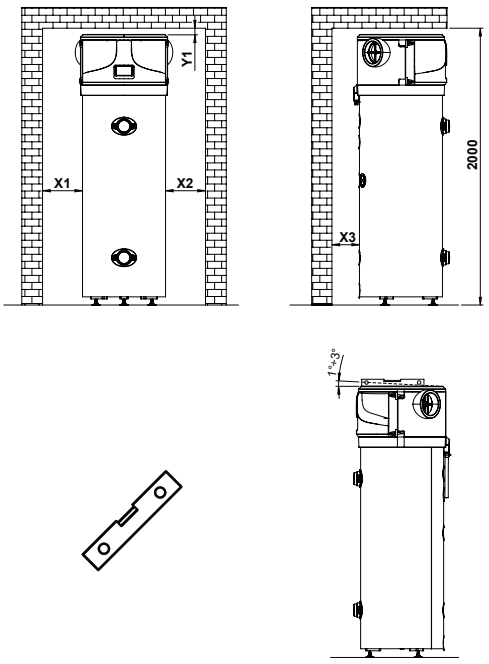


Fig. 20

5.2 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, as well as to be away from combustible surfaces. Therefore, it is important to allow the necessary working space by referring to the dimensions, shown in Fig. 18.

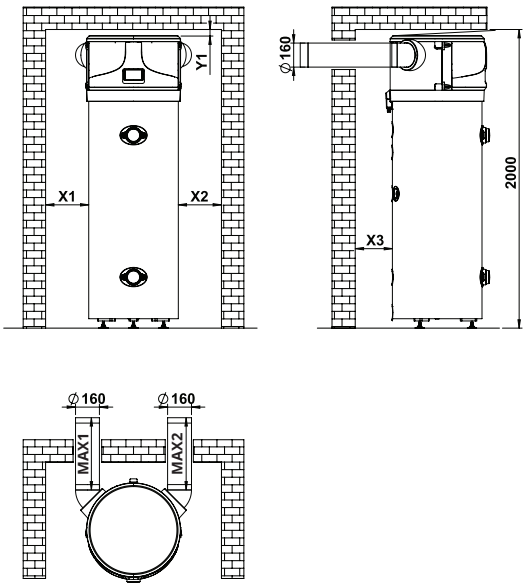


Fig. 18

X1	X2	X3	Y1
350 mm	350 mm	200 mm	50 mm

⚠ **In order to avoid the propagation of mechanical vibrations, do not install the equipment on floor slabs with wooden beams (e.g. in lofts).Isolate and lock off the main supply, posting a notice indicating that work is being carried out.**

5.3 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 illustration (Fig. 18, 19, 20).

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

The product data is measured and declared according the European regulations specifically for ducted installation. However, semi-ducted and non-ducted installations are also possible. Please find below the manufacturer recommendations in order to maintain the best possible level of performance and avoid installation mistakes:

5.3.1 Ducted installation (Fig.18)

Requirement for minimum room size where the HPWH will be installed:

For ducted installations the room size, where the product will be installed it is recommended to be not less than 10 m^3, due to the need of enough comfort space for installation and maintenance.

Both, intake and exhaust air are taken and expelled outside the house (building). Air duct diameter of 160mm should be used.

Additional room ventilation: not needed.After completing the maintenance work, the unit must be restored its original condition.

It is forbidden to open the access doors and carry out any technical or cleaning intervention, before having disconnected the device from the mains supply by isolating and locking off the main supply, and posting a notice indicating that work is being carried out.

5.3.2 Semi-ducted installation (the air outlet is ducted) Fig. 19

Requirement for minimum room size where the HPWH will be installed:

For Installation with one air duct (air outlet is ducted only) the room size, where the product will be installed is recommended to be not less than 10 m^3 (due to mainly installation comfort), with the obligation to be provided airflow of at least 350 m^3/h coming inside the room from outside. The needed airflow could be provided from open window, open door, a hole in the door or in the walls etc. It is absolutely necessary condition for the normal HPWH's work. If the needed air flow is not provided, the HPWH will not heat the water at normal conditions and will work with significantly decreased efficiency. In that meaning, if the HPWH is installed in small rooms an air flow with the necessary volume coming inside the room must be provided.

Maximum length of air outlet duct to be: MAX3 = 10m

5.3.3 Semi-ducted installation (the air inlet is ducted)

Requirement for minimum room size where the HPWH will be installed:

For semi-ducted installations (air inlet is ducted only) the room size, where the product will be installed is recommended to be not less than 10 m3, with the condition to be provided airflow of at least 350 m^3/h coming outside form inside the room. The needed airflow could be provided with open window, open door, a hole in the door or in the walls etc. It is absolutely necessary condition for the normal HPWH work. If the needed air flow is not provided, the HPWH will not heat the water at normal conditions and will work with significantly decreased efficiency. In that meaning, if the HPWH is installed in small rooms, an air flow with the necessary volume coming outside the room must be provided.

Maximum length of air inlet duct to be: MAX3 = 10m

5.3.4 Non-ducted Installation (Fig. 20)

Requirement for minimum room size where the HPWH will be installed:

To use the product in condition without air ducts, the following requirements must be followed strictly:

1. For non-ducted systems it is strongly recommended to be used at least 1 air-duct elbow of 90 (45)-degree, assembled to the outgoing air flow from the product. Even better would be to be used 2 elbows - one for the incoming air flow and the other one for the outgoing air flow, whose outputs point in opposite directions. Thus, the cold air produced from the HPWH will not be recirculated directly back to the unit and will not decrease significantly the efficiency.
2. The HPWH produces cold air. Thus the room temperature will be cooled down if it is not opened to an external sources of warmer air. To guarantee that the room temperature will not be cooled down very fast and will not decrease the efficiency significantly, the room size where the product is installed is recommended to be around 50m^3 or another option would be the room to be opened to external warmer air sources and thus the recommendation for the room size would be as minimum of 15 m^3.

If at least one of the 2 conditions is not provided, it must be considered that the ambient temperature will be cooled down with cooling power of around 1 kW/h. Thus, because the efficiency of the product is strongly related with the ambient temperature, it must be considered that the efficiency will also decrease together with the temperature of the ambient air. The level of efficiency can be checked via the declared data.

*the declared efficiency of the product is measured according EN 16147, for ducted installations conditions only.

ⓘ Exhaust air is a cold and could be used to support cooling system in your house

The maximum allowable pressure drop of 88 Pa must be assured. In regards to this, precise air duct length must be calculated as described below:

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 drops for all components, including through holes for mounting on external wall, within the pipe system must not exceed 88 Pa.

ⓘ All Technical parameters shown in the table above, are guaranteed at air flow rate 350 m^3/h at pressure 88 Pa. So please keep the following rules:

1. Use airduct pipe system with diameter Ø160mm
2. Maximum length of both, inlet and outlet straight pipes, must not exceed 10 meters.

(MAX1+MAX2=10m) See Fig. 18!!!

3. 1m straight pipe has pressure drop of ~2 Pa at 350 m^3/h; PVC material; dry air T=7°C
4. Each elbow 90o has pressure drop of ~28 Pa at 350 m^3/h; PVC material; dry air T=7°C
5. Elbow 45o has pressure drop of ~12 Pa at 350 m^3/h; PVC material; dry air T=7°C

Examples:

- Three elbows 90°(3 x 28Pa = 84Pa) + four pieces 0.5m straight pipes (4 x 0.5m x 2Pa = 4Pa) = total 88Pa
- Two elbows 90°(2 x 28Pa = 56Pa) + two pieces 4m straight pipes (2 x 4m x 2Pa = 16Pa) = total 72Pa

ⓘ 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.

⚠ 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.

⚠ Keep any required ventilation openings clear of obstruction;

⚠ The ducts connected to the appliance shall not contain any potential ignition source.

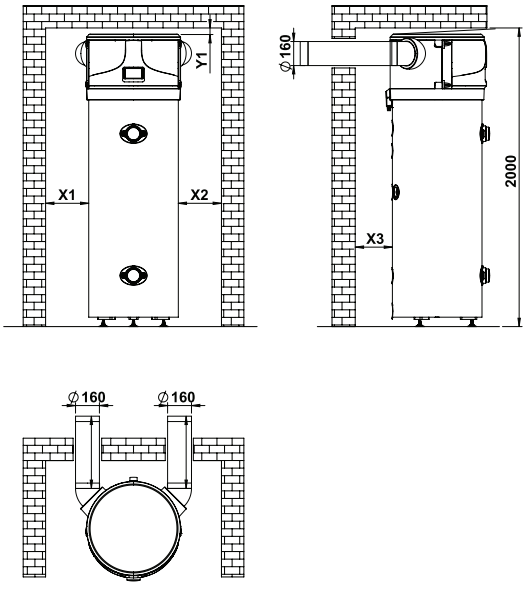


Fig. 18

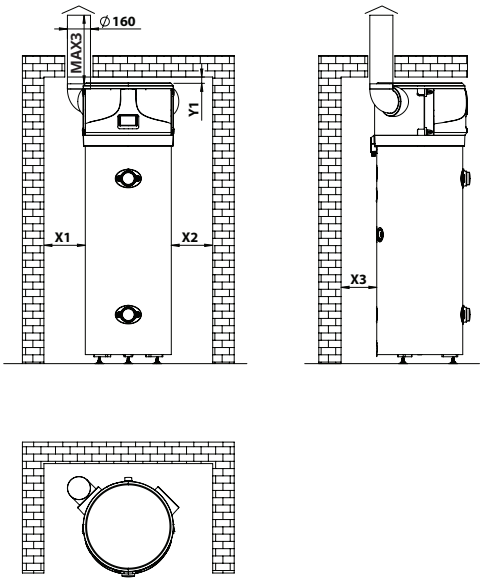


Fig. 19

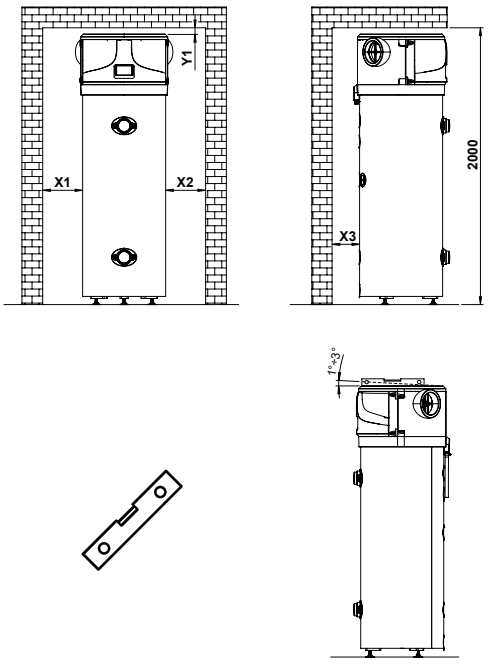


Fig. 20

5.4 Device mounting and connection (Fig.17)

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

The table below shows the characteristics of the connection points.

Dimensions [±5mm]	260	200
h [mm]	1911	1621
a [mm]	1248	898
b [mm]	298	298
d [mm]	1285	1000
f [mm]	1133	857
i [mm]	856*	857*
j [mm]	298	298
k [mm]	60	60
n [mm]	856*	857*
u [mm]	1430	1140
R [mm]	1988	1712
ØD [mm]	630	630
ØDF – Air Duct [mm]	160	160
M [mm]	1784	1491

* - for models with heat exchanger only

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 1 1/2
MA – Mg anodes - G 1 1/4
CD – condense drainage - G3/4

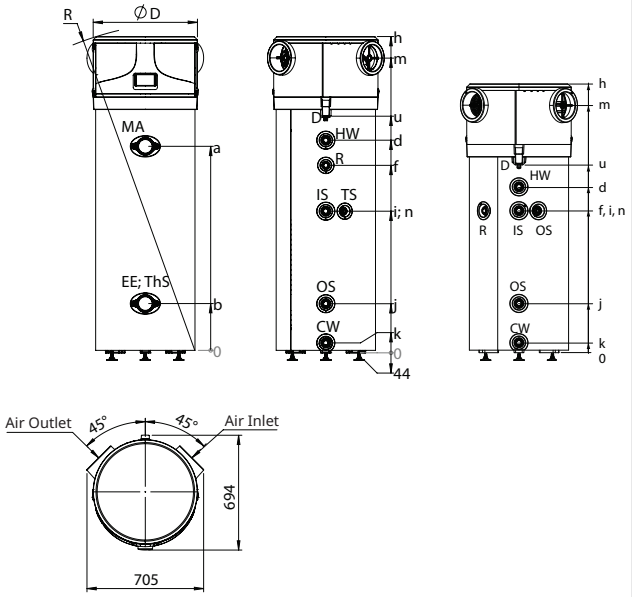
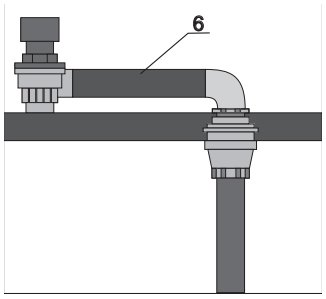


Fig. 17

5.5 Water supply connections

The following illustration (Fig. 22) shows an example of a water supply connection.



Obligatory elements to be installed:

1. Water inlet pipe
2. Shut-off valve
3. Inlet water pressure regulator
4. Back flow preventing valve
5. Safety valve – 8 Bar
6. Drainage
8. Tank drainage valve
10. Expansion vessel
11. Solar Safety valve – 6 Bar
12. Solar expansion vessel.
15. Recirculating pump; I max = 5A (solar or recirculation
16. Thermostatic mixing valve
18. External thermosensor (solar or recirculation)

E. Heat pump controller

⚠ Water that complies with European Drinking Water Directive (EU)2020/2184 must be used. The lifespan of the Tank unit will be shorter if groundwater (including spring waterr and well water) is used.

⚠ The Tank unit shall not be used with the tap water containing contaminents such as salt, acid and other impurities which may corrode the tank and its components.

⚠ Use sanitized water that is free of Legionella and other bacteria and microorganisms. If the water contains Legionella bacteria, it may harm the health of the user.

❗ 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.

⚠ Usage of this device at temperature and pressure level above prescribed leads to warranty violation!

⚠ This device is intended for heating of potable water in liquid state. Using different fluids in different states leads to warranty violation!

⚠ Device's heat exchangers are intended for use with circulating clean water and mixture of it plus Propylene GLYCOL at liquid state. The presence of anticorrosion additives is obligatory. Using different fluids in different states leads to warranty violation!

⚠ Dissimilar Metals cause galvanic corrosion. Therefore pipes, joints and fittings of dissimilar metals should be connected to the appliance by means of dielectric separators.

⚠ Plastic pipes (PP) are permeable to oxygen. It is forbidden to connect the heat exchanger to system made by PP pipes as well as to open circulation system! Abusing this rule will lead to corrosion inside tube.

⚠ It is obligatory for the system installer to fit an 8-bar safety valve No5 on the cold water intake pipe (Fig. 22).

⚠ It is forbidden a presence of any stop valves, taps between the safety valve and storage tank!

⚠ The maximum inlet water pressure from the water mains must not exceed 6 bar (0.6 Mpa);

⚠ The minimum inlet water pressure must be minimum 1.5 bar (0.15 Mpa);

❗ 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. 22)

❗ The drain pipe No6, connected to the safety valve must be installed sloping continuously downwards and, in a place, where it is protected against the formation of ice (Fig. 22).

❗ An expansion vessel No10 (Fig.22) should be installed in order to absorb water expansion due to temperature variation. Pressure regulator No3 and expansion vessel should be calculated together by qualified person.

⚠ **The heat pump for the production of domestic hot water is capable of heating water up to more than 65°C. For this reason, as a protection against burns, it is necessary to install an automatic thermostat mixing equipment No16 to the hot water-pipe (Fig. 22)**

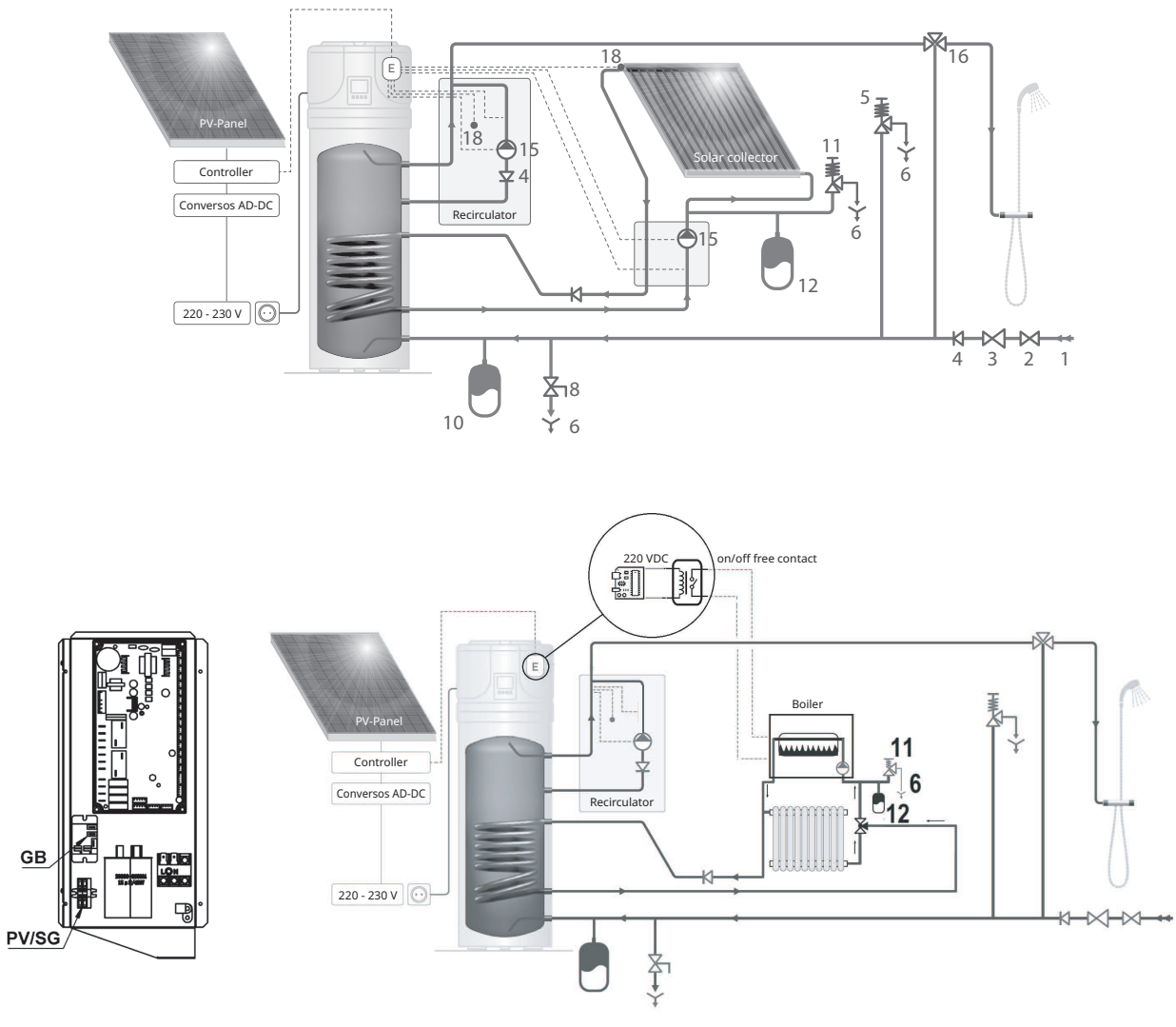


Fig. 22

5.6 Condense drain connections

Condensate, that forms during the operation of the heat pump, flows through an appropriate discharge pipe (G 3/4") that passes inside cladding and it comes out on the side of the equipment. Use flexible hose Ø16 (No. 69, Fig. 23) to connect it to the plastic nipple 68. Tighten the hose by means of hose clamp No70. This plastic part 68, should be handle with care in order to avoid damages. Connected the hose to a siphon so that the condensate can flow freely (Fig. 23).

⚠ The plastic nipple No. 68 (Fig. 23) should be manipulated gently, by hand, to avoid damages!

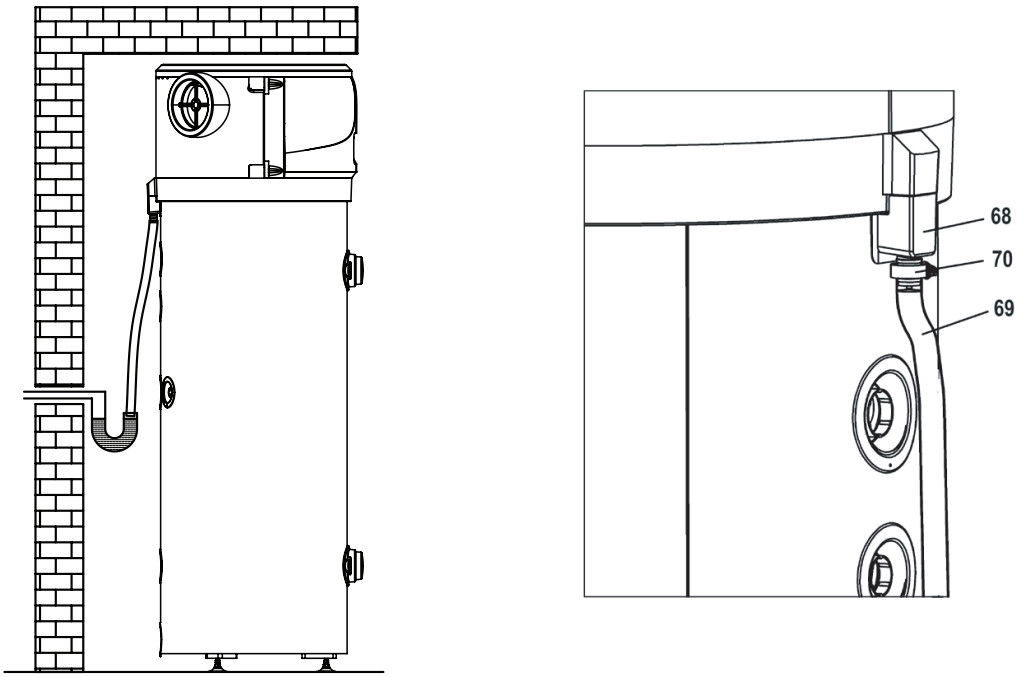


Fig. 23

5.7 Electrical connections

The device is supplied already wired for the main power supply. It is powered through a flexible cable and a socket/plug combination (Fig. 21). An earthed Schuko socket with separate protection is needed for the connection to the mains power supply.

⚠ **The power supply to which the equipment will be connected must be protected by an adequate residual current circuit breaker at least: 16A/230V**

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

⚠ **According to the connection to the main power supply and safety equipment (e.g., residual current circuit breaker) complying with standard IEC 60364-4-41 or the national wiring regulations of the respective country.**

❗ If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

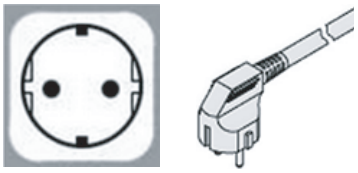


Fig. 21

6. COMMISSIONING

⚠ **Check that the equipment is connected to the earth cable.**

⚠ **Check that the line voltage corresponds to that indicated on the equipment identification plate.**

⚠ **Do not exceed the maximum permitted pressure indicated in the "general technical data" section; 8 Bar**

⚠ **Check that the water circuit safety valve is working;**

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

6.1 Filling the tank with water.

Fill the boiler by opening inlet tap No2 (Fig. 22) and the tap hot water of your bathroom. The tank is fully filled with water, when only water without air starts leaking trough the tap in the bathroom. Check that there are no leaks from gaskets and connections. Tighten the bolts or connections where necessary;Before each cleaning and maintenance intervention:

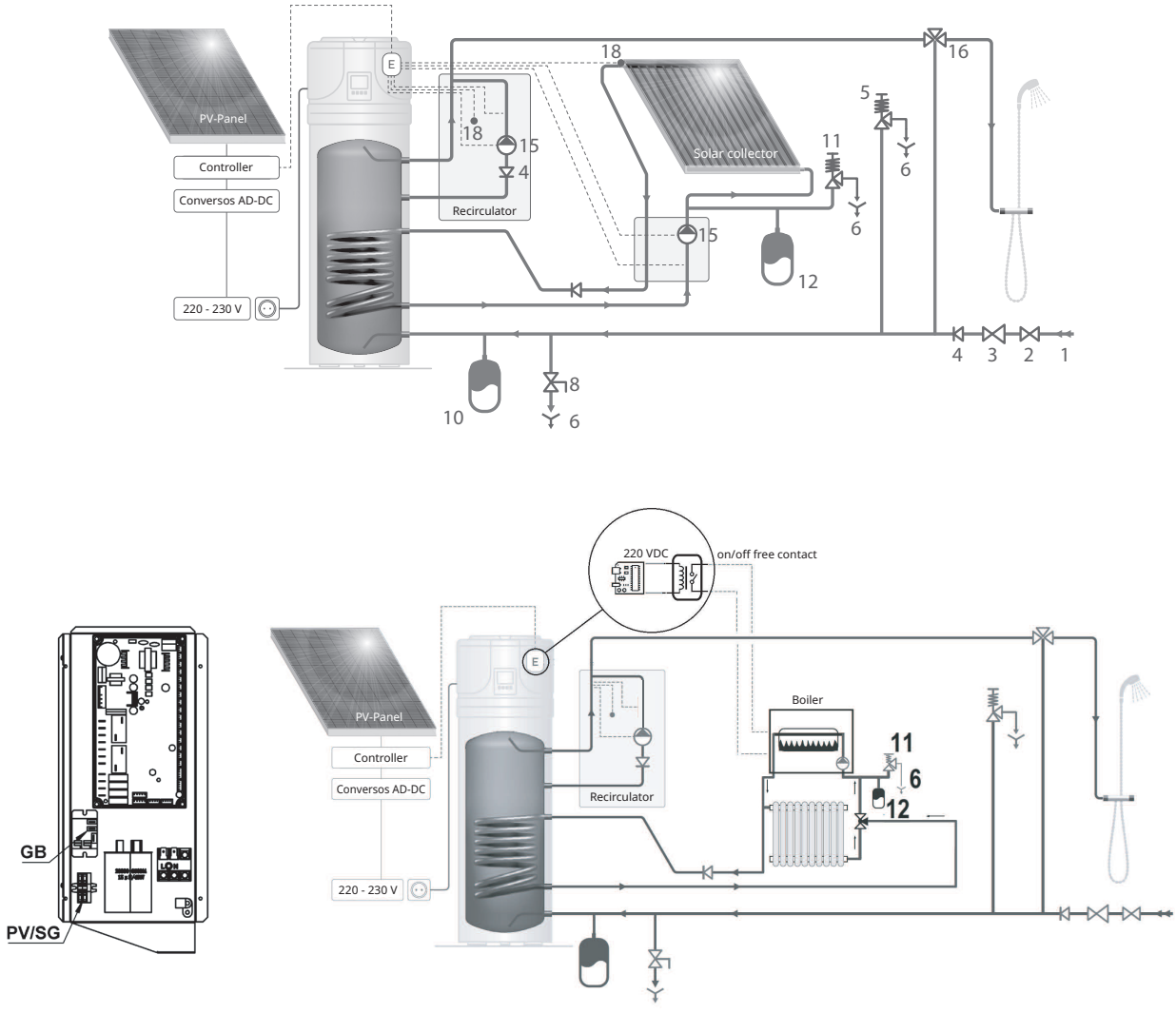


Fig. 22

7. CONTROLLER ADJUSTMENT, PARAMETERS

7.1 Wiring diagram

See Fig. 24, 25:

AT	Ambient air temperature sensor	**COMP**	Compressor
BTT	Lower tank temperature sensor	**E2V**	2-way defrosting valve
TTT	Upper tank temperature sensor	**ET**	Exhaust (compressor) temperature sensor
CT	Evaporator (coil) temperature sensor	**HP**	High pressure sensor
SUT	Return gas(compressor) temperature sensor	**EEV**	Electronic expansion valve

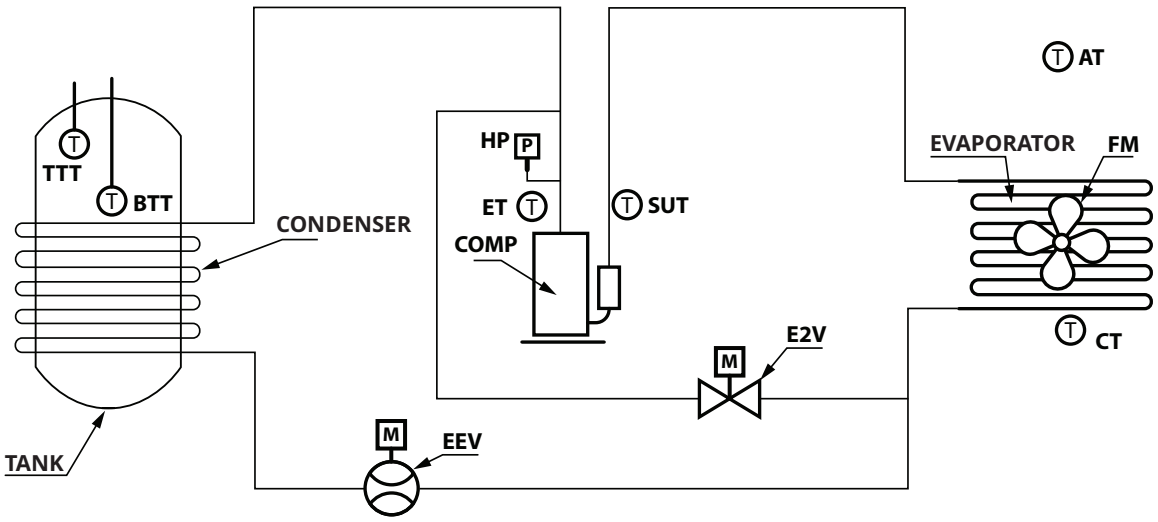


Fig. 24

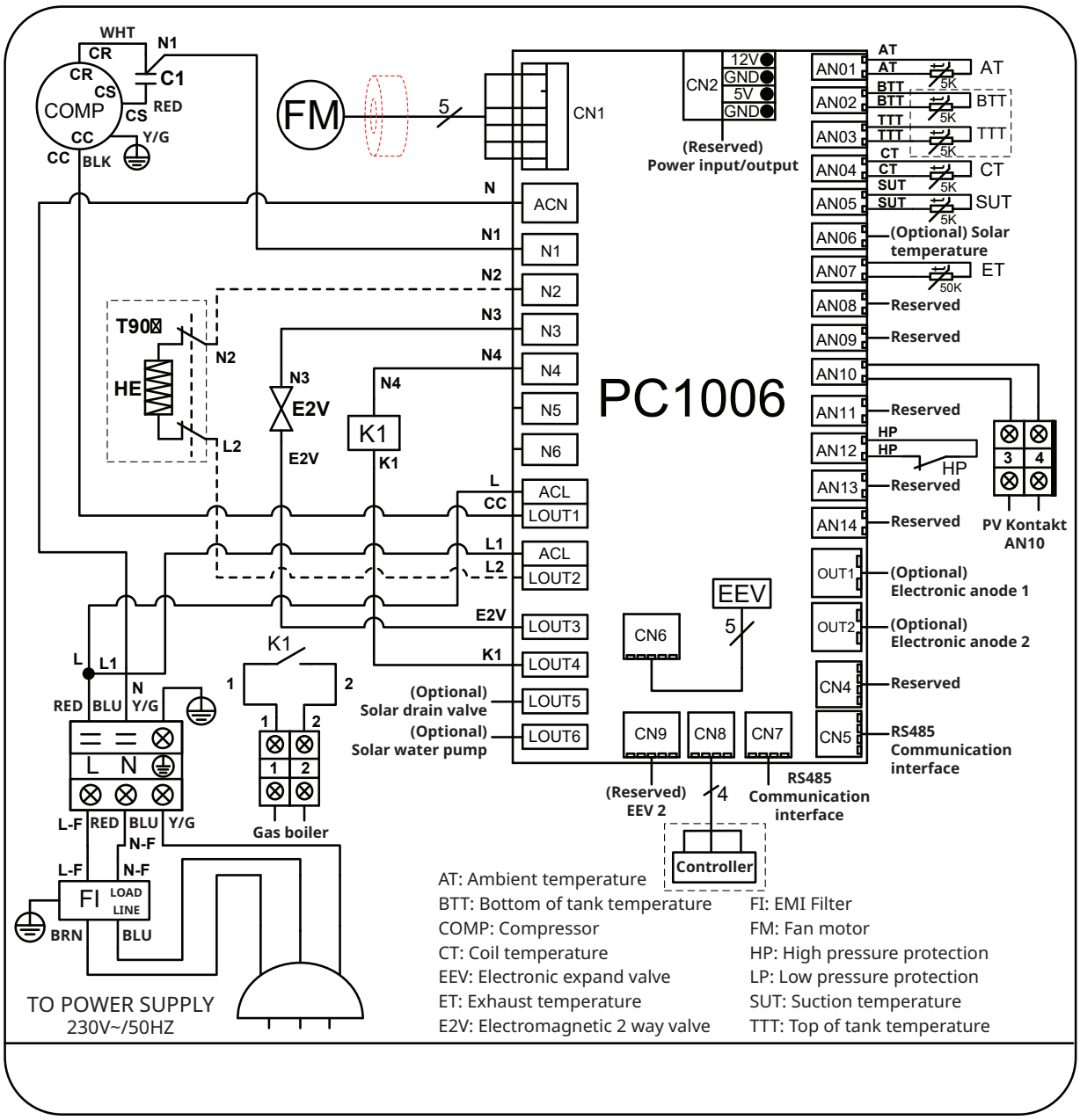


Fig. 25

7.2 To change parameters

⚠ **The Factory settings (password "066") are only ment to be used by qualified Technician/Installer for the initial start-up of the product. Panasonic will not accept claims related to unauthorized access and modification of parameters by unqualified personnel.**

With the "Mode button" (MODE) confirm operation;
With "Power ON/OFF button" ⏻ cancel operation and goes back one step.

On the main interface, press and hold the "Mode button" (MODE) for 10 seconds to enter the password setting interface.

At this time, the main display area displays 0 0 0;

Short press the "UP button" △ or "DOWN button" ▽ to select 022 for customer settings and 066 for factory settings;

Short press the "Mode button", to enter the password, if the password is wrong, it will return to the main interface;

if short press the "Power ON/OFF button" , it returns to the main interface; If there is no operation on the Control panel for 20 seconds, it will return to the main interface.

In the main display area are shown parameter values; in the auxiliary display area are shown parameter numbers.

- Customer settings. (The fixed password is: 022, which cannot be modified)

At this time, the "main display area" displays the parameter value, and the last three digits of the "time display area" display the parameter number E01;

Short press the "UP button" or "DOWN button" , parameters will be displayed cyclically;

Short press the "Mode button" (MODE), the parameter value of the "main display area" flashes; (t, O parameters without steps 3~6);

Short press the "UP button" or "DOWN button" to increase or decrease the parameter value respectively;

Short press the "Mode button" (MODE), the parameter value will be saved and the "main display area" will no longer flash and return to parameter number;

- Factory setting: (The fixed password is: 066, which cannot be modified)

At this time, the "main display area" displays the parameter code;

Short press the "UP button" or "DOWN button" , parameters will be displayed cyclically

If there is no action for 20 seconds, the system will automatically record the parameters and return to the main interface.

7.3 Restore factory parameters

To restore factory parameters in power-on state press and hold "Mode button" (MODE) for 10 seconds. By "UP button" or "DOWN button" choose customer password 022 and confirm with "Mode button" (MODE) .

Press and hold "Mode button" (MODE) for 2 seconds in the main display area will be shown - - - -. Press and hold "DOWN button" for 2 seconds, 3 dashes - - - will be running and after few seconds in the main display area will be shown d0n. The factory parameters are restored. Short press "Power ON/OFF button" to exit the menu.

7.4 Factory Parameters Interface

Defrosting parameters

№	Parameter Description	Default Value	Range	Remarks	Password
d01	Defrost cycle	45min	5~90 min	Adjustable	66
d02	Maximum defrosting time	8min	1~120 min	Adjustable	66
d03	The temperature point of exiting defrosts	13°	0~30 °C	Adjustable	66
d04	The temperature point of entering defrost	-7°	-30~0 °C	Adjustable	66
d05	Slip defrosting coil Temperature minimum	-18°	-30~0 °C	Adjustable	66
d06	Defrost ambient temperature deviation after slippage	14°	0~20 °C	Adjustable	66
d07	Defrost coil temperature deviation after slippage	10°	0~20 °C	Adjustable	66
d08	Defrost coil temperature deviation after slippage	2°	0~20 °C	Adjustable	66
d09	Defrost mode	0	0-standard; 1-economy; 2-reserved;	Adjustable	66
d10	Slip end point coil temperature	0°	-30~5 °C	Adjustable	66
d11	Economical defrost minimum time	10min	5~30 min	Adjustable	66

Electronic expansion valve parameters

№	Parameter Description	Default Value	Range	Remarks	Password
E01	Electronic expansion valve adjustment	1	0-manual; 1-automatc	Adjustable	66
E02	Target superheat of electronic expansion valve	5 °C	-20~20 °C	Adjustable	66
E03	Initial steps of electronic expansion valve	240	0~500	Adjustable	66
E04	Minimum steps of electronic expansion valve	100	0~500	Adjustable	66
E05	Defrost steps	480	0~500	Adjustable	66
E06	The manual target steps of electronic expansion valve	0	0~480	Adjustable	66

Fan parameters

№	Parameter Description	Default Value	Range	Remarks	Password
F01	Fan type	0	0-DC fan; 1-Single speed fan; 2-Two speed fan; 3-Three speed fan; 4-Inverter DC fan; 5-Reserved; 6-Reserved;	Adjustable	66
F02	Fan manual speed	0	0~150	Adjustable	66
F03	Fan fault logic enable	1	0~255	Adjustable	66
F04	Fan high speed value	110	0~150	Adjustable	66
F05	Fan low speed value	30	0~150	Adjustable	66
F06	Fan coil temperature value at high point	15	0~50	Adjustable	66
F07	Fan coil temperature value at low point	35	0~50	Adjustable	66
F09	DC fan speed 1	32	0~150	Adjustable	66
F10	DC fan speed 2	38	0~150	Adjustable	66
F11	DC fan speed 3	56	0~150	Adjustable	66
F12	DC fan speed 4	70	0~150	Adjustable	66
F13	DC fan speed 5	83	0~150	Adjustable	66

High temperature disinfection parameters

№	Parameter Description	Default Value	Range	Remarks	Password
g01	High temperature disinfection target temperature	63 °C	50~75 °C	Adjustable	66
g02	High temperature disinfection maintenance time	40 min	0~90 min	Adjustable	22
g03	High temperature disinfection start time	23h	0~23h	Adjustable	22
g04	High temperature disinfection cycle	30 day	1~99 day	Adjustable	22

System parameters

№	Parameter Description	Default Value	Range	Remarks	Password
H01	Power-down memory function	1	0-No; 1-Yes;	Adjustable	66
H02	Fahrenheit to Celsius conversion	0	0-No; 1-Yes;	Adjustable	22
H03	Mixed water temperature and lower water temperature calculation proportion	10	0-10	Adjustable	66
H05	Calculated time after thermostat shutdown in economy mode	5	1-255min	Adjustable	66
H07	Temperature adjustment from main interface	0	0-No; 1-Yes;	Adjustable	66
H08	Central control address	1	1~255	Adjustable	66

Solar / Recirculation parameters

№	Parameter Description	Default Value	Range	Remarks	Password
n01	What kind of temperature sensor is used to control solar energy	0	0-Bottom; 1-Top;	Adjustable	66
n02	The maximum running time of solar water pump	15 min	1-30min	Adjustable	66
n03	Solar water pump start-up temperature difference	20 °C	0~20°C	Adjustable	66
n04	Whether the night cooling mode is turned on	0	0-No; 1-Yes	Adjustable	66
n05	Start-up time of the cooling function	00h	00~23h	Adjustable	66
n06	Stop time of cooling function	06h	00~23h	Adjustable	66
n07	Start-up temperature to cool down at night	70 °C	40~90 °C	Adjustable	66
n08	Stop temperature difference of night cooling	10 °C	1~40 °C	Adjustable	66
n09	Solar drain valve temperature set point	68 °C	50~75 °C	Adjustable	66
n10	Solar pump stop temperature set point	50 °C	50~75 °C	Adjustable	66
n11	Whether the solar energy operates independently	0	0-No; 1-Yes;	Adjustable	66
n12	Water pump	0	0-no water pump; 1-circulation pump; 2-solar water pump;	Adjustable	66
n13	Water temperature to start the circulation pump	38 °C	15~50 °C	Adjustable	66
n14	Water temperature difference to start the circulation pump	10 °C	5~20 °C	Adjustable	66

Temperature parameters

№	Parameter Description	Default Value	Range	Remarks	Password
r01	Hot water setting temperature	55 °C	38~75°C	Adjustable	66
r02	Enable: 0-None; 1-Low pressure switch; 2-Solar sensor; 3-Both: low pressure switch and solar sensor;	0	0~3	Adjustable	66
r03	Restart temperature difference setting according T02, used for all working modes, except High-Demand Mode	5°C	1~20 °C	Adjustable	66
r04	Whether to enable electric heating setting temperature	0	0-No; 1-Yes;	Adjustable	66
r05	Electric heating setting temperature	55 °C	50~75 °C	Adjustable	66
r06	Electric heating start delay time	200 min	0~250 min	Adjustable	22
r07	Whether electric heating replaces the compressor	1	0-No/ 1-Yes	Adjustable	66
r08	Ambient temperature that electric heating replaces the compressor	-7 °C	-20~10 °C	Adjustable	66
r09	Ambient temperature for electric heating starts without delay	5 °C	0~30 °C	Adjustable	66
r10	Ambient temperature for electric heating delay start	25 °C	10~40 °C	Adjustable	66
r11	Constant frequency or variable frequency setting	0	0-fixed; 1-Inverter;	Adjustable	66
r12	Compressor forced stop temperature	-15 °C	-30~-5 °C	Adjustable	66

№	Parameter Description	Default Value	Range	Remarks	Password
r13	External control	5	0-Default running; 1-S06 defined by external switch; 2-S06 defined by the timer; 3-S06 defined by external switch, timer is valid; 4-S06 defined by external switch, timer is valid and only E-heater is used; 5-S06 defined by external switch, timer is valid and compressor and E-Heater are simultaneously used;	Adjustable	22
r14	The second external temperature set point-PV	75°C	38~75 °C	Adjustable	66
r15	High temperature compressor stop temperature	78 °C	55~80 °C	Adjustable	66
r17	Whether the temperature at the top of tank control compressor.	0	0-No; 1-Yes;	Adjustable	66
r18	Restart temperature difference setting at the top of tank	3 °C	1 ~ 20 °C	Adjustable	66
r19	Compressor stop temperature 1	65 °C	30~75 °C	Adjustable	66
r20	Compressor stop temperature 2	55°C	30 ~ 75 °C	Adjustable	66
r21	The highest ambient temperature electric heat replaces of compressor	43 °C	25~60 °C	Adjustable	66
r22	Restart temperature difference setting according T03, used for the High-Demand Mode	10 °C	1~50 °C	Adjustable	66

Output status parameters

№	Parameter Description	Range	Remarks	Password
O01	Compressor operating frequency	\	Observe	66
O02	Fan speed	\	Observe	22
O03	The current steps of the electronic expansion valve	\	Observe	66
O04	Compressor running cumulative time	\	Observe	22
O05	Electric heating operation cumulative time	\	Observe	22
O06	Actual overheat	\	Observe	22
O07	Compressor phase current value	\	Observe	66
O08	Compressor status	0-OFF, 1- ON	Observe	22
O09	Electric heater status	0-OFF, 1- ON	Observe	22
O10	Four-way valve or Two-way valve status	0-OFF, 1- ON	Observe	22
O11	Solar circulating pump status	0-OFF, 1- ON	Observe	66
O12	Solar drain valve status	0-OFF, 1- ON	Observe	66
O13	Fan high speed	0-OFF, 1- ON	Observe	66
O14	Fan low speed	0-OFF, 1- ON	Observe	66
O15	Reserved	\	Observe	66
O16	Reserved	\	Observe	66
O17	DSP software version	\	Observe	66
O18	PFC software version	\	Observe	66
O19	EEPROM version	\	Observe	66
O20	Reserved	\	Observe	66
O21	IPM temperature	\	Observe	66
O22	Bus voltage	\	Observe	66
O23	Frequency limit protection status	\	Observe	66

№	Parameter Description	Range	Remarks	Password
O24	Reduce frequency protection status	\	Observe	66

Measured temperature values

№	Parameter Description	Default value	Range	Remarks	Password
t01	Ambient temperature	ATT		Observe	22
t02	The actual temperature of the bottom sensor	BTT		Observe	22
t03	The actual temperature of the top of water tank	TTT		Observe	22
t04	Coil temperature	CT		Observe	22
t05	Suction temperature	SUT		Observe	22
t06	Solar sensor/Recirculation water sensor			Observe	66
t07	Exhaust (compressor) temperature	ET		Observe	22
t09	Target frequency			Observe	66

8. EXTERNAL CONNECTIVITY

8.1 Solar collector (thermal power) integration

Connection and adjustment of main controller should be done as follows: The Parameter "n12" must be configured by the installer (2 = solar water pump) and "r02" to be adjusted to value 2. External circulation pump 15, Fig.25 (I max = 5A) must be connected to the terminal LOUT6 + N6 (Neutral), as well as the solar thermosensor 18 should be connected to the main PCB terminal AN06

- Condition to start up the solar water pump:
  n12 = 2, r02 = 2
  t06 ≥ t02 + n03 and t06 < n10
- Condition to stop the solar water pump:
  After the solar water pump runs continuously for n02 time, when t02 ≥ t06-1 or t02 ≥ n10, the solar water pump stops.
- Independent operation of solar water pump:
  If n11 = 0, the start of the solar water pump does not affect the compressor.
  If n11 = 1, when the solar water pump is turned on, the compressor is stopped; When the solar water pump is turned off, the compressor starts.

⚠ Device's solar heat exchanger is intended for use with circulating clean water and mixture of it and Propylene Glycol at liquid state. The presence of anticorrosion additives is obligatory. Using different fluids in different states leads to warranty violation!

⚠ Only qualified persons should design and install solar loop with all elements according to the Fig. 22!

8.2 Solar photovoltaic (PV) integration / Signal grid integration SG

PV signal connection should be done according to Fig. 26. An external relay 6, should be installed (field supply). The product is connected to the electricity network of the premises, not directly to the PV. When detecting a PV signal, the PV/SG ready function activates (observed at terminal AN10, where parameter S06 transitions from 0 to 1). The default maximum temperature is set to parameter – r14 (by default – 75°C). Parameter r13 is used to modify the PV/SG functionality in various ways. Depending on the value assigned, this functionality modifies temperature adjustments, operational modes, and the activation of the Electrical heater and compressor.

Parameter r13 is used to change the PV/SG functionality in below ways:

- If r13 = 0 – Unit works according manually set parameters (if signal S06 is received there will be no change of the work of the unit). The icon for connectivity doesn't light;
- If r13 = 1 and signal is received (parameter S06=1), the set temperature r01 will be replaced by r14 (75°C) . The unit follows the logic of the current mode. If the unit is in Power OFF state by timer, or vacation mode the unit will not start when signal is received. The icon for connectivity is lit;
- If r13 = 2 (Reserved) and signal is received (parameter S06=1), the unit keeps set temperature by parameter r01. The unit operate according to the manually set parameters. If there are set timers or vacation mode, they are valid. The icon for connectivity is lit;
- If r13 = 3 - S06 defined by external switch, timer is valid;
- If r13 = 4 – The unit uses only E-heater to reach the MAX T as it is defined with parameter r14.
- If r13 = 5 – Compressor and E-heater work simultaneously. Compressor stops at the r19(default value) and E-Heater runs alone till water reaches MAX T according to Figure 27. In this case if there is set timer, it is valid

In Auto-mode when when the PV signal is deactivated the heater will continue to work untill the Tset is reached.

When PV signal is detected the PV function is with higher priority. If you try to set the TIMER or the VACATION mode, the system will cancel the first try. In that case you will need to make the settings for a second time, so that the system will allow you to make the settings.

⚠ Only qualified persons should design and install photovoltaic system!

8.3 Installation of an external re-circulation pump

The circulation of sanitary hot water is useful to avoid water becomes cold in the sanitary circuit if not used for some time. In this way the hot water will be always ready when required.

In case there is a need to re-circulate hot sanitary water, an external pump must be connected and installed hydraulically and electrically according to Fig. 22 and 25. The max available output for the pump is 5 A resistive. Also, the optional thermosensor 18 (Fig. 22) must be connected to the controller terminal AN06 (Fig. 25) and correctly positioned on the hydraulic plant (see Fig. 22). The Parameter n12 must be configured by the installer (1= circulation pump) and parameter r02 to be adjusted to value 3 or 2.

The logic of recirculation pump function is as follow:

The water pump starts:
n12 = 1 and r02 = 3
if t02 > n13 and
t02 > t06 + n14 or t06 < n13

The water pump stops:
if t06 = t02 – 3°C

8.4 External boiler or E-heater back up

Installation of External boiler is possible if it is hydraulically connected to the appliance according to the Fig. 22-2;

A signal (on/off contact) could be transmitted to the boiler, when it is connected to the output relay on main PCB Fig. 22-3

The end user could choose whether to have external boiler or E-heater as a back up energy source. This could be done by pressing E-heater button for 5 seconds. E-heater icon or Boiler icon starts flashing (depend what is chosen, factory setting is E-heater). With a short press of button it is chosen whether e-heater or boiler will be used for back up heating. Chosen state should be confirmed by MODE Button (MODE). After the back up source has been chosen, this function will work according to the control logic of the appliance's working mode.

When back up source is active, then the icon or icon starts to flash, and in the main display area shows on every 2 seconds "OFF" and outlet water temperature.

Once the set temperature is reached the "E heater only" / Boiler function is deactivated. This mode is activated once per push.

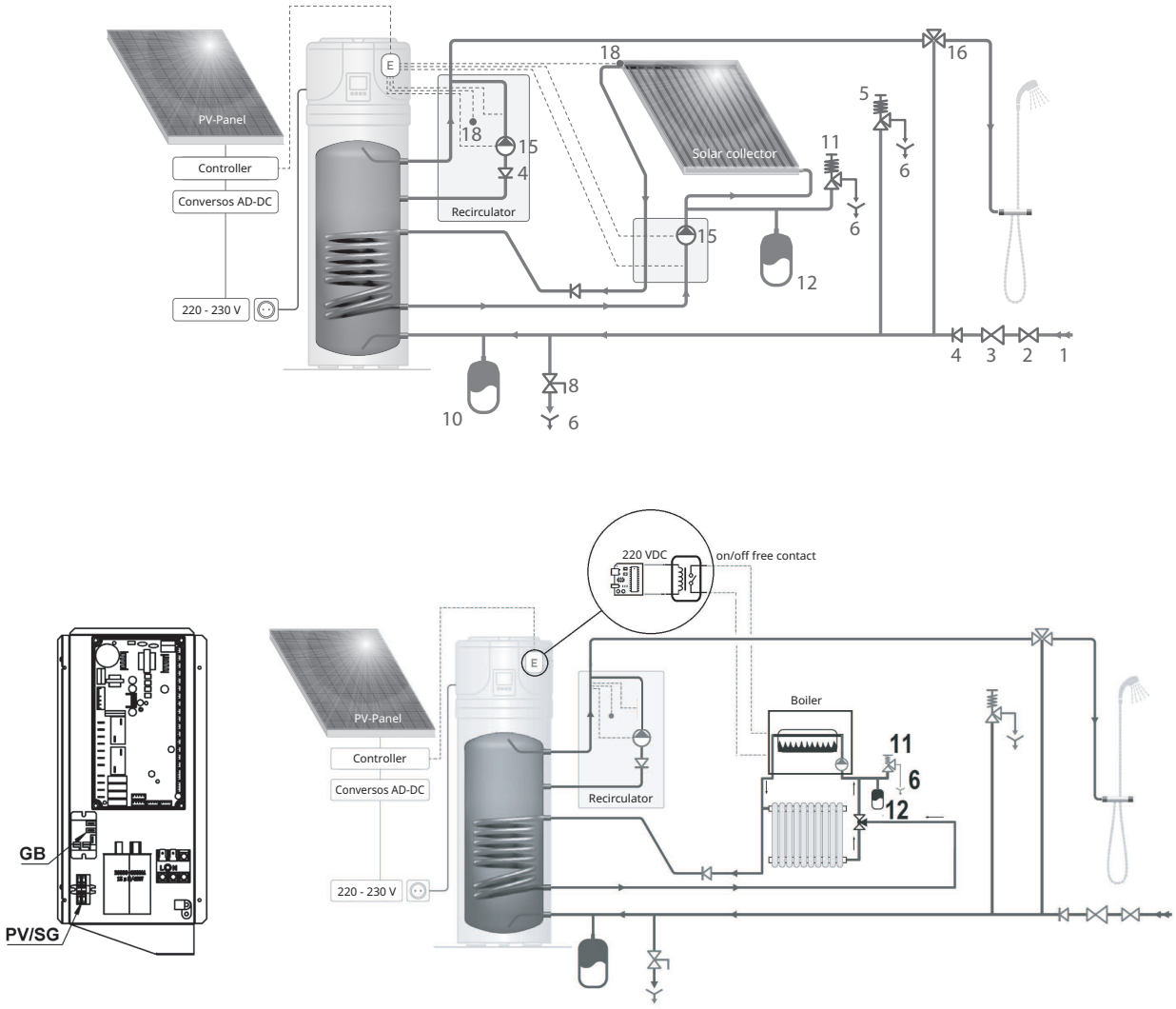


Fig. 22

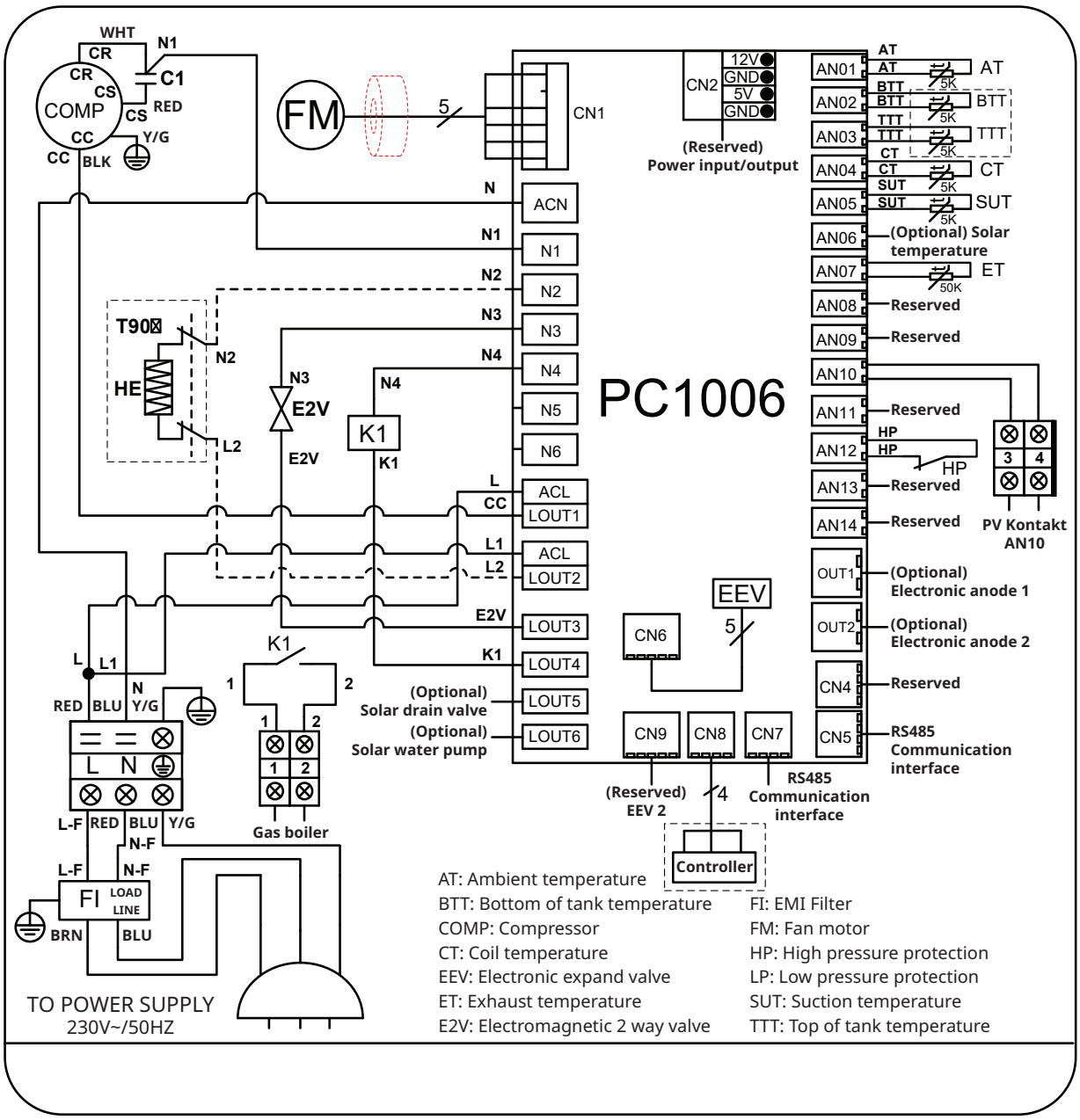

PC1006
WHT
CR
N1
C1
COMP
CS
RED
Y/G
CC
BLK
FM
CN1
CN2
12V
GND
5V
GND
(Reserved)
Power input/output
AN01
AN02
AN03
AN04
AN05
AN06
AN07
AN08
AN09
AN10
AN11
AN12
AN13
AN14
AT
BTT
TTT
CT
SUT
5K
50K
(Optional) Solar temperature
ET
Reserved
HP
PV Kontakt AN10
ACN
N1
N2
N3
N4
N5
N6
ACL
LOUT1
LOUT2
LOUT3
LOUT4
LOUT5
LOUT6
T90
HE
E2V
K1
L
L1
L2
EEV
CN6
CN9
CN8
CN7
CN4
CN5
OUT1
OUT2
(Optional) Electronic anode 1
(Optional) Electronic anode 2
(Optional) Solar drain valve
(Optional) Solar water pump
RS485 Communication interface
(Reserved) EEV 2
Controller
Gas boiler
FI
LOAD LINE
BRN
BLU
TO POWER SUPPLY
230V~/50HZ
AT: Ambient temperature
BTT: Bottom of tank temperature
COMP: Compressor
CT: Coil temperature
EEV: Electronic expand valve
ET: Exhaust temperature
E2V: Electromagnetic 2 way valve
FI: EMI Filter
FM: Fan motor
HP: High pressure protection
LP: Low pressure protection
SUT: Suction temperature
TTT: Top of tank temperature

Fig. 25

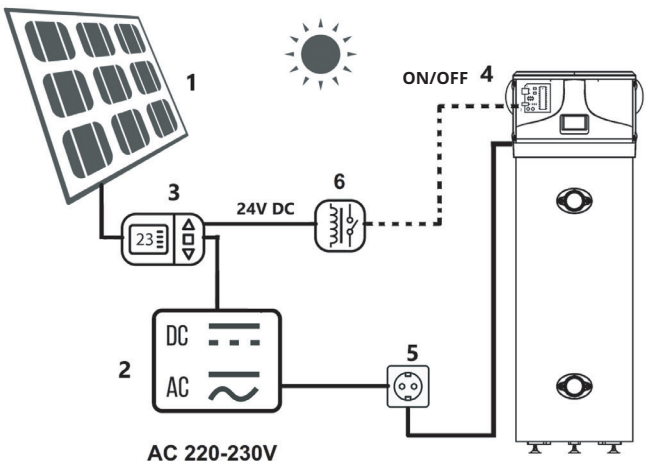

1
ON/OFF
4
3
24V DC
6
2
DC
AC
5
AC 220-230V

Fig. 26

9. MAIN FUNCTIONALITIES OF THE APPLIANCE

9.1 Working range and temperatures (Fig.27)

The maximum achievable water temperature by heat pump only, depends on outside air inlet temperature and could be seen on Fig. 27

If the set temperature (via control display) is more than the achievable one as per Fig. 27, the E-heater will be switched ON automatically to reach it.

9.2 Starting procedure (Fig.29)

In the first 5 sec, after the unit has been switched on, the fan is started. Expansion valve (EEV) begins to reset and is moved to its starting position (240 steps) after 55 sec.

When 60 sec from the switch on passes, the compressor starts and 3 min. later the EEV begins to regulate the heating process.

9.3 Shut down procedure (Fig. 30)

When the unit is switched off, the compressor stops. EEV is reset to 500 steps. Fan continue working 60 sec after the compressor stops.

9.4 Fan speed

In order to prevent too high refrigerant pressure during the Summer, the appliance is equipped with DC modulated fan. The fan speed is regulated according to coil temperature CT.

9.5 Eco Mode

The unit start to heat when t02 < Tset. Unit starts according to Fig. 29.

In this mode only compressor work to maximum achievable temperature depending from ambient temperature t01 and out of this range the heating element is active. Compressor is driven by temperature sensor t02. Restart temperature is set by parameter r03 (default r03 = 5°C). In this mode both, compressor and heating element are driven according the temperature measured by bottom sensor t02.

In this mode is illuminated in the mode area of the display.

9.6 Auto Mode

The unit start to heat when t02 < r01.

In this mode compressor starts to work according Fig. 29 and after r06 (default r06 = 200min.) time if the target temperature is not reached, heating element starts too. Heatin element and compressor work according to Fig.27. In this mode compressor is driven by temperature t02, and the heating element by t03.

The restart temperature for both the compressor and the heating element is t02, t03 < 55°, if Tset > 60°, if t1 is between 5° and 25°, otherwise if t1 is between less than 5° or greater than 25°, the start temperatures are t2, t3 < 50°, if Tset > 55°.

In this mode AUTO icon is illuminated in the mode area of the display.

9.7 High-Demand Mode

This mode is activated when the is pushed. The e-heater (or boiler if selected (see 10.5)) starts to work simultaneously with the compressor all the time till Tset is reached. In this case compressor also works according Fig.27.

In this mode is illuminated in the mode area of the display.

Short pressing the “MODE button” (BOOST 3s MODE) disables the High-Demand Mode, and the unit switches to Eco-mode.

9.9 Boost Mode

When boost function is activated compressor and heating element (or boiler if selected (see 10.5)) work simultaneous to reach Tset, but corresponding to Fig.27.

In this function is illuminated in the mode area of the display.

This function is one time active. When Tset is reached the unit exits boost function and switch to previous active mode.

The Boost-mode can be deactivated manually by pushing mode button (MODE) for 3 seconds. Then the unit goes back to its previous working mode.

If the Boost-mode is activated from Auto-mode and it is manually de-activated the E-heater will continue to work till the set temperature is reached.

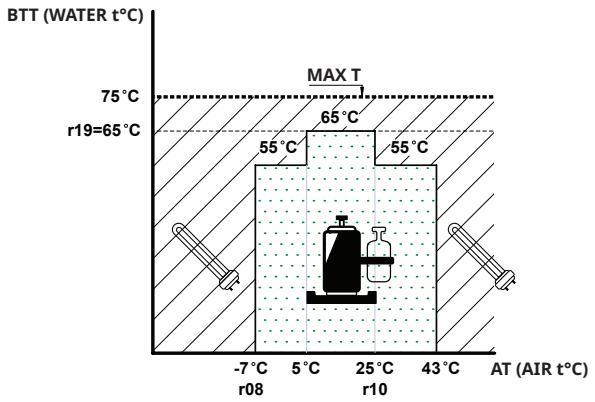


Fig. 27

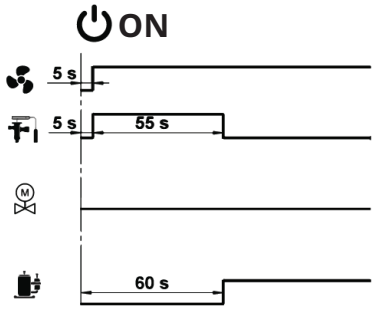


Fig. 29

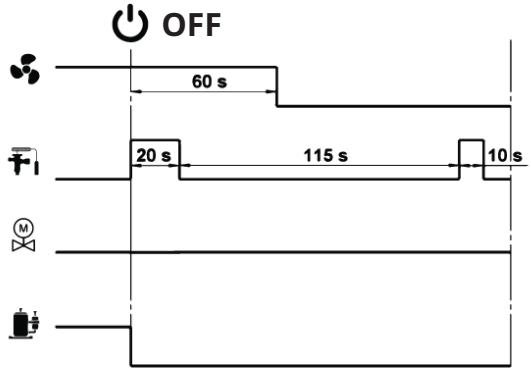


Fig. 30

10. OTHER IMPORTANT FUNCTIONALITIES AND CONTROLLER ADJUSTMENT

10.1 Ventilation function

Press and hold the "UP" button △ for 10 seconds to set the ventilation function. When ventilation function is turned on and compressor is on, the ventilator works on maximal speed. When compressor is off, the fan works on speed set by parameter F08 (Default F08 = 5).

For this function in the current software version are available only F08 = 0 (Fan is OFF) and F08 = 5 (Fan is ON).

10.2 Disinfection function

When In power on state and time g04 passes, at the next g03 time point, the electric heating is turned on for high-temperature sterilization.

If the temperature at the top of the water tank t03 ≥ g01-2°C lasts for more than g02 minutes, or the top of the water tank temperature sensing fails, or the time of high-temperature sterilization exceeds 9 hours, the unit will exit the high-temperature disinfection mode.

The default values are:
(g04) Days – 30 days
(g03) Hour – 23 (for 23:00)
(g01) t°C – 63°C
(g02) Duration – 40 min

⚠ If disinfection function needs to be switched off, set g02 to 0 min!

10.3 Defrost control

"Standard defrost"

It is done according to the control logic, depending from the air temperature AT, Coil temperature CT. The working mode while defrosting is shown on Fig.28

"Forced defrosting" function

In the standby state, press and hold the "POWER" button ⏻ for 10 seconds to turn on the forced defrosting function, and the "defrosting" symbol lights up. Press and hold the "Power On/Off button" ⏻ again for 10 seconds to exit the forced defrosting function.

During the pressing the "Power On/Off button" ⏻ , the icon for lock key 🔒 will light up for short time.

10.4 Antifreeze mode

When the unit is in standby mode, if the water temperature in the tank is below 4°C (tank water frozen protection), only the heating element will work, until tank temperature increases above 8°C or the unit is turned on.

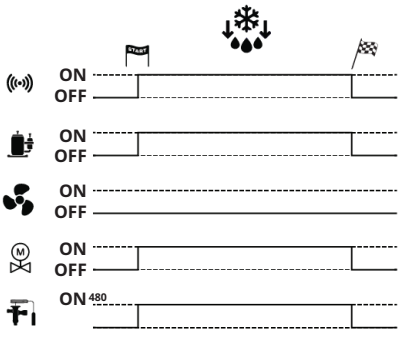


Fig. 28

11. MAINTENANCE AND CLEANING

⚠ **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.**

⚠ **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.**

11.1 Resetting of safety thermostat

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 the plastic cover 35 by undoing the appropriate locking screws 36 (Fig. 12);
- Manually reset the safety thermostat 40, by pushing the button as shown with (Fig. 12).
- Reassemble the lower cover that was previously removed

⚠ **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.**

⚠ **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.**

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

Thermal protections
When the tank water keeps going up and reaches 90°C, the manual reset cut-off will be active, the electrical heater stops, unless you manually reset the protector.

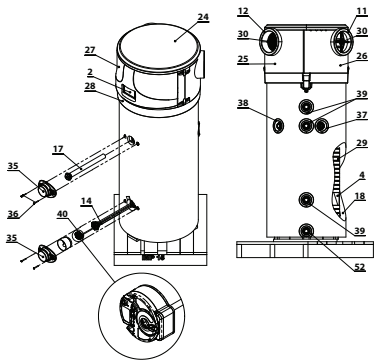


Fig. 12

11.2 Quarterly inspections

- Visual inspection of the general conditions of the equipment systems as well as the absence of leaks;
- Inspection of the ventilation filter, if present

11.3 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 11.4).

11.4 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's 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 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:

- Empty the water from the boiler (see paragraph 11.5);
- 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;

The anodes have appropriate sealing gaskets, in order to avoid causing water leaks, it is recommended to use anaer-

obic 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.

⚠ The integrity of the magnesium anodes must be checked at least every two years (even better if checked on an annual basis). The manufacturer does not bear the responsibility for all consequences caused by not obeying the instructions, given hereby.

11.5 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.

Close tap 2 (Fig. 22). Then open the tap hot water in the bathroom or kitchen which one is closer to the tank. Next step is to open draining tap 8 (Fig. 22).

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

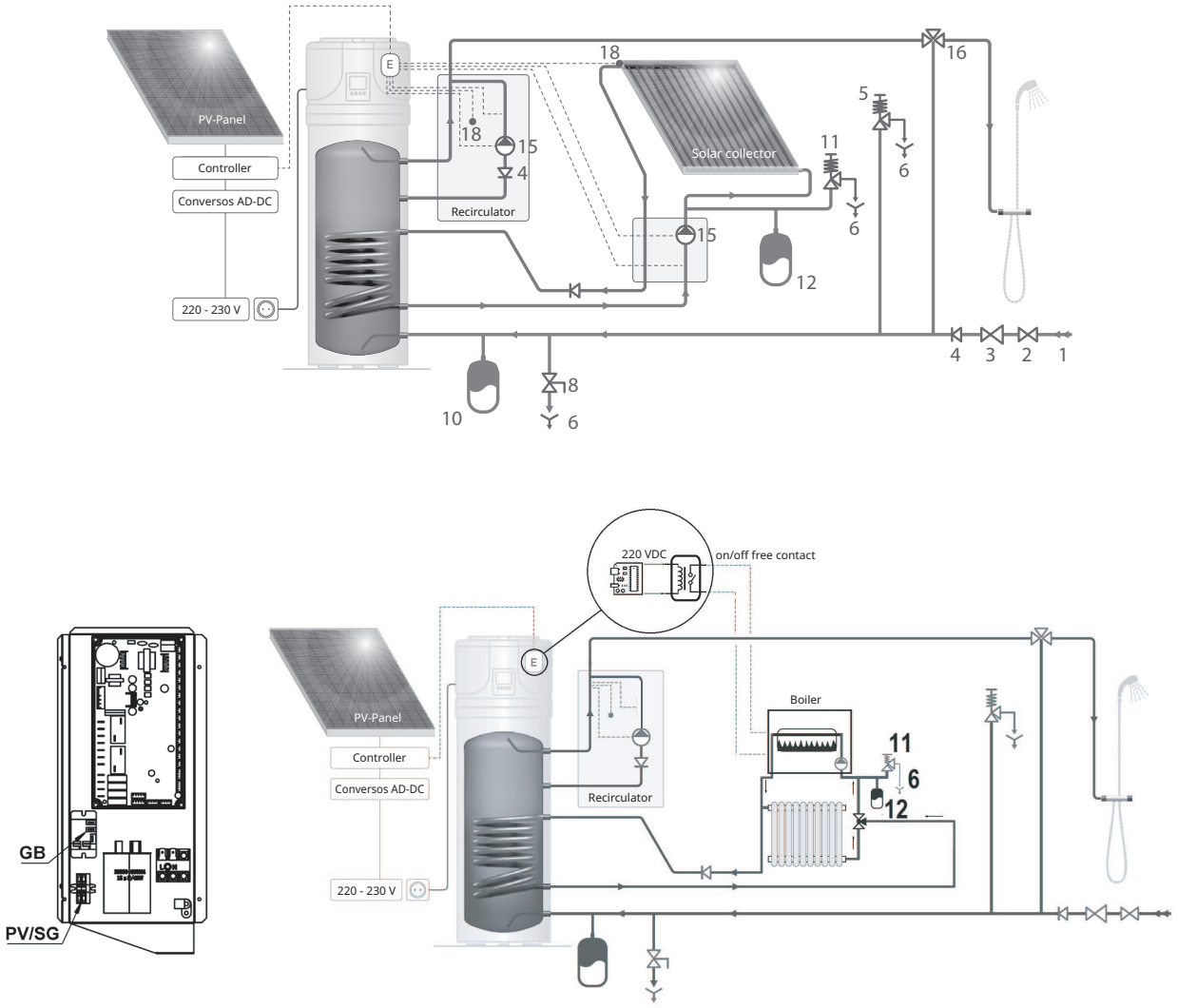


Fig. 22

11.6 Cabling

After completing the maintenance:
Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

11.7 Refrigerant circuit

⚠ Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

During maintenance and servicing the following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)

Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

Acceptable leak detection methods are:
- bubble method,
- fluorescent method agents.

If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

During maintenance and servicing

Removal:
Removal of refrigerant shall be according to the following procedure:

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:
- remove refrigerant;
- purge the circuit with inert gas;
- evacuate;
- purge with inert gas;
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

Refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

⚠ **This operation is absolutely vital if brazing operations on the pipe-work are to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.**

Charging procedures:
In addition to conventional charging procedures, the following requirements shall be followed.
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Recovery:
When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

12. TROUBLESHOOTING

Fault interface

When the unit fails, the fault code will be displayed in the "main display area".

1). In the fault interface, press the "ON/OFF button" ⏻ to return to the main interface. (After returning to the main interface, all other operations can be performed);

2). On the fault interface, press and hold the "ON/OFF button" ⏻ for 10 seconds to manually recover the fault (most faults cannot be manually recovered, please refer to the controller function manual for specific recoverable faults);

3). In the fault interface, press the "UP" △ or "DOWN" ▽ buttons to display multiple faults in a loop;

4). Under the main interface, if there is no operation for 10 seconds, it will return to the fault interface.

Remarks: When the communication fault E08 is reported, only the fault code but not the fault quantity will be reported, and other faults will not be displayed.

In the presence of errors, the Error icon ⚠ lights up. The icon is active in the Power On state. The Error icon remains constantly light when there is an error in the system and continues to be light until the error is resolved or cleared through the functions in the Errors screen.

Non-error tips

1) Why the compressor is not running when I start up the unit?
Answer: When the unit is powered on after the last shut-down, the compressor will not run until 3 minutes later. This is the self-protection of the unit.

2) Why sometimes the outlet water temperature on the display increases slowly?
Answer: Because the water temperature is different between the upper layer and bottom layer in the tank at the beginning. When the water temperature in all parts of the tank is basically the same, it will rise faster.

3) Why the outlet water temperature on the display decreases when the unit is in heating mode?
Answer: If the upper water temperature is much higher than that of the bottom water, the water temperature will decrease a little because of the heat convection between hot water and cold water in the tank.

4) Why does the unit not start up to heat when the outlet water temperature decreases?
Answer: The water temperature will decrease because of the heat loss if the hot water in the tank is not used for a long time. In order to avoid the continual ON/OFF, the unit will not start up until the water temperature decrease for more than 5°C.

5) Why does the outlet water temperature decrease a lot abruptly?
Answer: The temperatures of hot water and cold water in the tank are different. The cold water may go to the upper sensor when the hot water has been used up.

6) Why the hot water is still available when the water out temperature on the display decreases a lot?
Answer: Because the upper sensor is positioned near the top of the tank, there is still 1/5 of hot water available when the outlet water temperature on the display decreases a lot.

7) Why the compressor stops but the fan keeps running when the unit is in the heating mode?
Answer: The unit needs to defrost when the evaporator freezes because of the low ambient temperature. The compressor will stop and the fan keeps running when the unit defrosts.

8) Why is the heating time so long?
Answer: Energy saving, little power consumption and long heating time are the distinguishing features of the units. Normally, the heating time is 2~11 hours according to the inlet water temperature, water consumption and ambient temperature.

If installation is done as semi-ducted or non-ducted Fig. 19 and 20, and there is not sufficient room ventilation, the heating time could increase considerably

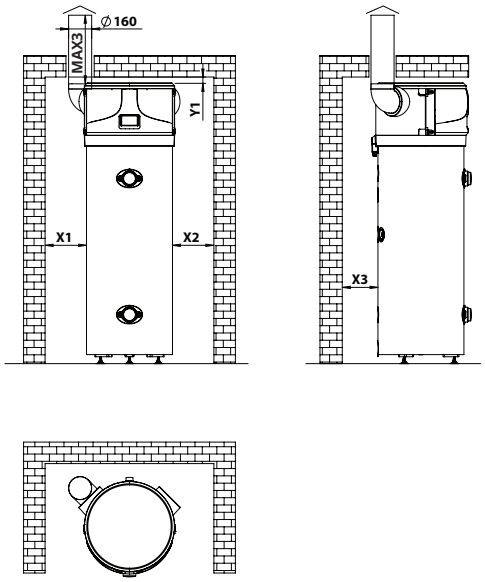


Fig. 19

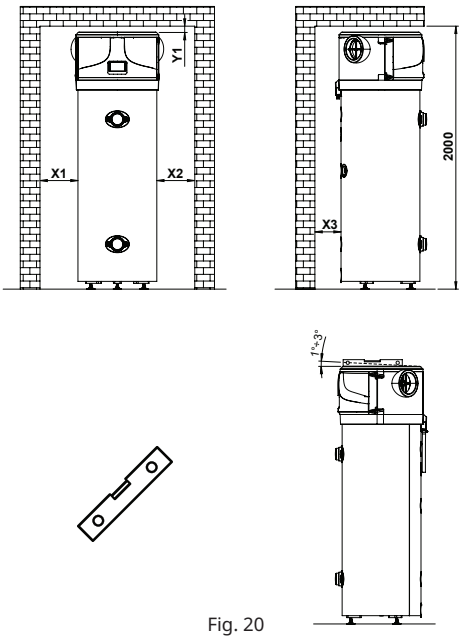


Fig. 20

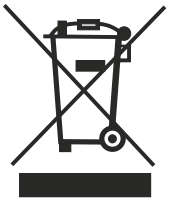
12.1 Malfunctioning of the unit and error codes

Display	Malfunction Description	Corrective action
P01	Bottom sensor water temp. failure (sensor is open or short circuit)	Check or change the bottom sensor water temp.
P02	Top tank water temp. sensor failure (sensor is open or short circuit)	Check or change the top tank water temp. sensor.
P03	Exhaust (compressor) temp. sensor failure (sensor is open or short circuit)	Check or change the Exhaust (compressor) temp. sensor.
P04	Ambient temp. sensor failure (sensor is open or short circuit)	Check or change the ambient temp. sensor.
P05	Coil (evaporator) temp. sensor failure (sensor is open or short circuit)	Check or change the Coil (evaporator) temp. sensor.
P07	Suction (compressor) temp. sensor failure (sensor is open or short circuit)	Check or change the Suction (compressor) temp. sensor.
P08	Solar temp. sensor failure (sensor is open or short circuit)	Check or change the solar temp. sensor. Check parameter r02
P82	Discharge overheating protection	Check if the refrigerant system has leak points or is blocked.
E01	High-pressure protection (The exhaust pressure is high, high-pressure switch action)	Check the high-pressure switch or check if the refrigerant system is blocked.
E02	Low pressure protection (The suction pressure is low, Low pressure switch action)	Check the low-pressure switch or check if the refrigerant system has leaks.
E08	Communication failure (Wired remote control with master signal failure)	Check the connection line between the wired remote control and motherboard.
E09	Winter frost protection	The water temperature is too low, please pay attention to anti-freezing.
E11	DC motor stalling	Check the motor and its connector.
E43	High pressure switch tripple activation protection	Check the high-pressure switch or check if the refrigerant system is blocked.
E44	Low pressure switch tripple activation protection	Check the low-pressure switch or check if the refrigerant system has leaks.
E45	Discharge overheating tripple activation protection	Check if the refrigerant system has leak points or is blocked.

⚠ **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.**

13. DISPOSAL

Information to users:



The symbol on the product or packaging indicates that the product must not be treated as normal household waste, but must be taken to the appropriate collection point for recycling of used electrical and electronic equipment and batteries.

Proper disposal of this product avoids harm to humans and the environment and promotes the reuse of valuable raw materials.

For more detailed information about the recycling of this product, contact your local authority, your household waste disposal service or the shop where you purchased the product. Illegal disposal of the product by the user involves the application of the administrative sanctions provided for by the regulations in force. This provision is valid in the EU Member States.

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

- Steel
- Magnesium
- Plastic
- Copper
- Aluminum
- Polyurethane

14. PRODUCT FICHE

Product fiche – Outdoor air heat pump (placed indoor side (EN16147:2017)

Description			P-DHW260CAE5	P-DHW260AE5	P-DHW200CAE5	P-DHW200AE5
Declared load profile			XL	XL	L	L
Water heating energy efficiency class under average climate conditions			A+	A+	A+	A+
Water heating energy efficiency in % under average climate conditions	ηWH	%	148	150	148	149
Annual electricity consumption in kWh under average climate conditions	AEC	kWh/a	1132	1118	693	684
Reference thermostat temperature settings of the water heater		°C	55			
Sound power level Lwa indoors in dB		dB	50			
Sound power level Lwa outdoors in dB		dB	56			
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 class under colder climate conditions			A	A	A	A
Water heating energy efficiency in % under colder climate conditions	ηWH	%	117	120	108	110
Annual electricity consumption in kWh under colder climate conditions	AEC	kWh	1430	1401	947	923
Water heating energy efficiency class under warmer climate conditions			A+	A++	A++	A++
Water heating energy efficiency in % under warmer climate conditions	ηWH	%	158	162	158	159
Annual electricity consumption in kWh under warmer climate conditions	AEC	kWh	1062	1035	648	641

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