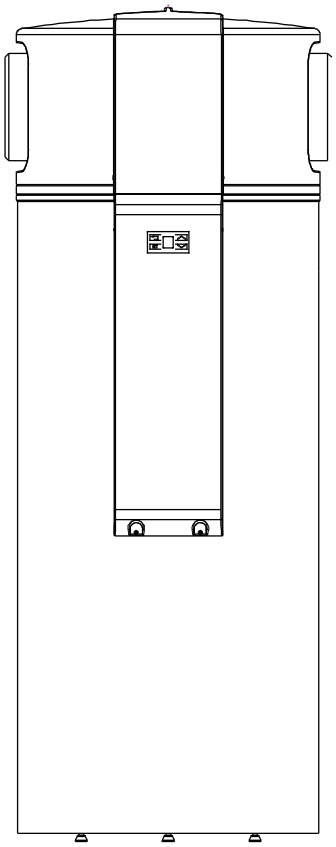
installation and maintenance manual

FOR THE INSTALLER AND THE USER

DYNAMIS MAX
450

HEAT PUMP FOR DOMESTIC HOT WATER HEATING



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Appliance Naming

In the documentation, products of Dynamis Max range can be designated indifferently using their full name or abbreviated name:

Dynamis Max 450 or DM 450

Liabilities of the Manufacturer, the Installer and the End user

Manufacturer

Our products are manufactured in compliance with the requirements of the applicable European Directives and standards, and are therefore delivered with all the required documentation and markings.

The quality of our products is essential to us, and we aim therefore at improving them continually. To this end, we reserve the right to change the technical characteristics and features of our products without prior notice. Please check for the latest revision of the manual on our website (www.myaic.eu).

The manufacturer shall not be held liable for any malfunction of the product resulting from:

- *The failure to comply with the safety and installation instructions provided herein,*
- *The failure to comply with the safety and operation instructions and recommendations provided herein,*
- *The failure to have the appliance maintained regularly,*
- *A modification of the appliance that is not approved by the manufacturer,*
- *The use the product for any other purpose than its intended use,*
- *The use of components and accessories that are not approved by the manufacturer.*

Installer

The installer is responsible for the correct installation, conversion (as required) and commissioning of the appliance according to:

- *The instructions and recommendations provided herein*
- *The applicable regulations and standards*

The installer shall provide the end-user with:

- *Any relevant explanation about the operation of the appliance and the heating system as well as the safety devices that are provided,*
- *Any instruction regarding periodic checks to be performed and possible anomaly to be reported*
- *All the documentation delivered with the appliance and installed accessories.*

The installer shall also inform the end-user of the necessity to have the appliance checked and maintained regularly by a qualified professional.

End-user

To ensure the best performances and safety of the appliance, the end-user shall:

- *Make sure that the appliance is installed, converted (as required), commissioned and adjusted by a qualified professional,*
- *Make sure that the appliance is checked and maintained regularly by a qualified professional,*
- *Comply with all the instructions and recommendations provided in the appliance documentation,*
- *Make sure to receive from the installer all the necessary explanations related to the operation of the appliance and the safety devices,*
- *Make sure to receive from the installer all the appliance and accessories documentation,*
- *Keep all the appliance documentation in a safe place for future use.*

The end-user shall use the product for its intended use.

- Should the installer or the end user not comply with the instructions and requirements stated in this manual, the warranty will be void.
- For more information on the warranty terms and conditions, please connect to our website: www.myaic.eu.

About this Manual

This documentation is part of the product. It will be handed over to the end-user who will keep it, with all the other applicable documents, in a safe place and readily available for use.

Before installing, operating or maintaining the unit, please carefully read this manual and all the applicable documents provided with the components and accessories. They contain essential safety information.

Safety message symbols

Indicates an essential instruction which, if not followed, can result in a hazardous situation that can cause serious damage to equipment and/or injuries or death.

Indicates an essential instruction in relation with the presence of electrical power and a danger of electrical shock.

Indicates an important instruction which, if not followed, could result in a hazardous situation that could cause damage to equipment and/or injuries.

Indicates important information.

Safety-related symbols

High Voltage - danger of electric shock.

Moving parts - risk of being crushed or torn.

Hot surface - risk of burns.

Sharp surface - risk of cuts.

Dangerous substance - risk of damage or injuries.

Fire hazard

Wear safety shoes

Wear safety gloves

Wear safety glasses

Wear ear protections

Wear respiratory protection

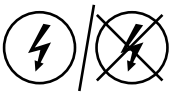
Use fire-fighting equipment

Operation-related symbols

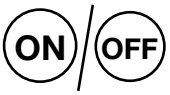
Heating circuit supply connection.

Heating circuit return connection.

Ground / Earth.



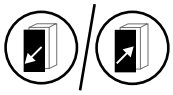
The electrical supply to the appliance must be activated/deactivated through the external circuit breaker or the power supply cable must be connected/disconnected.



The unit must be started/stopped using the ON/OFF function of the control panel.

Refrigerant circuit must be full/empty.

The water circuit must be full of water/empty.



The access panel(s) of the appliance must be open/closed.

General Safety Instructions

THIS UNIT CONTAINS
POTENTIALLY HAZARDOUS TOXIC SUBSTANCES

- **Follow the safety instructions and emergency procedures contained in this manual.**
- **In case of absolute necessity, perform an emergency stop by shutting down the power supply through the cut-out fuse in the electric box.**

- This product is intended exclusively for domestic hot water production and the simultaneous cooling of spaces.
- Any use not specified in this manual is prohibited.
- This unit must be installed according to the applicable local regulations and standards.
- Make sure to wear protective personal equipement (respiratory protection, gloves, safety glasses, etc.) to carry out cleaning and maintenance tasks.
- Cleaning and user maintenance shall not be performed by children without supervision. Children shall not play close to or with the unit.
- Any modification to the unit and its components is strictly forbidden without the prior written consent of the manufacturer.
- If components need to be replaced, only genuine factory parts or components approved by the manufacturer must be used.

- When working on the unit and the system, make sure to use the appropriate tools to avoid damaging the pipes and components.
- Do not use the unit in excessively dusty, aggressive or explosive atmospheres, or in environments where there are heavy vibrations or electromagnetic fields.

- *When unpacking the unit, check the integrity and condition of the packaging and that all the components and accessories described in the packing list are present. Contact your supplier in case of problem.*
- *When discarding the packaging, do not contaminate the environment. Dispose of it according to the applicable local regulations on recycling.*

Package Contents

- A Dynamis Max heat pump
- A water condensation removal pipe
- An Installation and Maintenance manual

Refer to **"Unpacking the Unit" on page G-30** for the complete unpacking and installation instructions.

Customer Support - Service

Customer support and service while warranty lasts are provided by device manufacturer. When submitting a service claim, we ask you to provide the following information:

- Exact name of the product
- Serial number
- Year of manufacture

All of the data above is listed on the data plate. During the service request, you should also describe the cause of the problem.

In any case of a change of original components, forced or improper use of the device, the warranty becomes null and void. Possible expenses stemming from a service intervention are charged to the user in their entirety. During warranty period, only the manufacturer or a service may carry out service and maintenance procedures. If that is not the case, the warranty becomes null and void.

Unit Marking

The data plate is located on the right side of the unit, above the hot water connection.

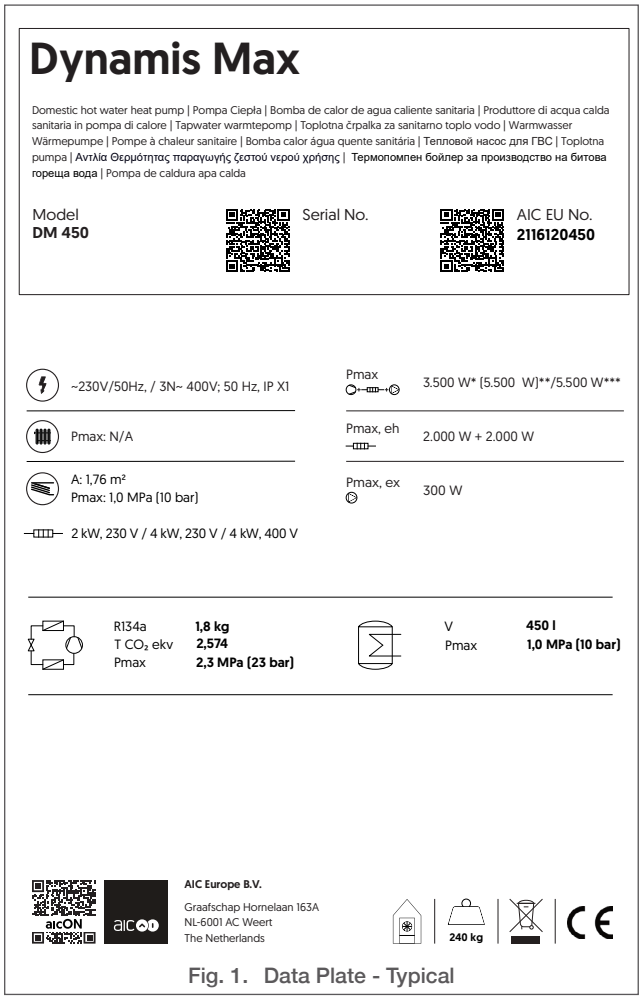


Fig. 1. Data Plate - Typical

Symbol	Description
	electrical data
	Pmax maximum operating pressure
	Pmax maximum operating pressure in the heat exchanger **A** surface of the heat exchanger
	electrical heater data
	cooling circuit
Pmax	max power of the device (compressor + electric heater + additional load)
Pmax,e h	max power of the electric heater

Symbol	Description
Pmax,e x	max load electrical power
	Domestic Hot Water
CE	CE sign for the compliance of the device with CE directives
	internal device
	note about handling waste electronic equipment
	empty weight

Dynamis Max - Heat pumps for domestic hot water heating

This unit is a heat pump for heating domestic water in residential and small business premises. When heating water, the heat pump also cools the area from which the air is drawn and/or to which it returns. The heat pump can therefore, be used for cooling indoor spaces, but only if there is a need to heat domestic water at a given time.

In order to achieve the highest efficiency and savings, we recommend that air from rooms with waste heat (boiler room, laundry, kitchen, cellar, pantry) is used as the heat source and that the air temperature is as high as possible.

The appliance consists of a generator (compressor, evaporator, fan, ...) and a hot water tank. The generator housing is made of durable plastic and is thermally and acoustically insulated. The unit has two air duct attachments that allow remote air intake and exhaust from adjacent rooms or from the environment. The hot water tank is equipped with a tubular heat exchanger that can be connected to an external boiler powered by fossil fuel, biomass or solar energy.

Components description

Domestic Hot Water Tank

The domestic water heater is enamelled with patented technology, thermally insulated with polyurethane and mechanically protected with sheet metal. The tank is equipped with a water heat exchanger as standard, which can be connected to the boiler if an additional heat source is selected. The tank is also equipped with an Mg anode which prevents the heater from corrosion in case of possible mechanical damage to the enamel.

Heating Element

The appliance is serially equipped with two 2 x 2 kW electric heaters which serve as additional or reserve heating source. Together with both already installed heaters it is possible to install an additional heater in the sanitary hot water tank by means of a 6/4" connection with separate power supply.

Anti-freeze Probe

The heat pump controller senses the evaporator temperature. If the evaporator temperature is below -7 °C, the unit switches off safely for at least 30 minutes. In this case, heat pumps with an electric heater automatically switch to electric heating, and heat pumps with a connected boiler to boiler heating (switching on the circulation pump).

Safety Thermostat

The heating element is equipped with a safety thermostat with a limit of 75°C. This means that if this temperature is exceeded in the hot water tank, the power will be switched off and the appliance will stop working. In order to restart the unit, an authorised installer must be called to check and remedy the cause of the safety shutdown.

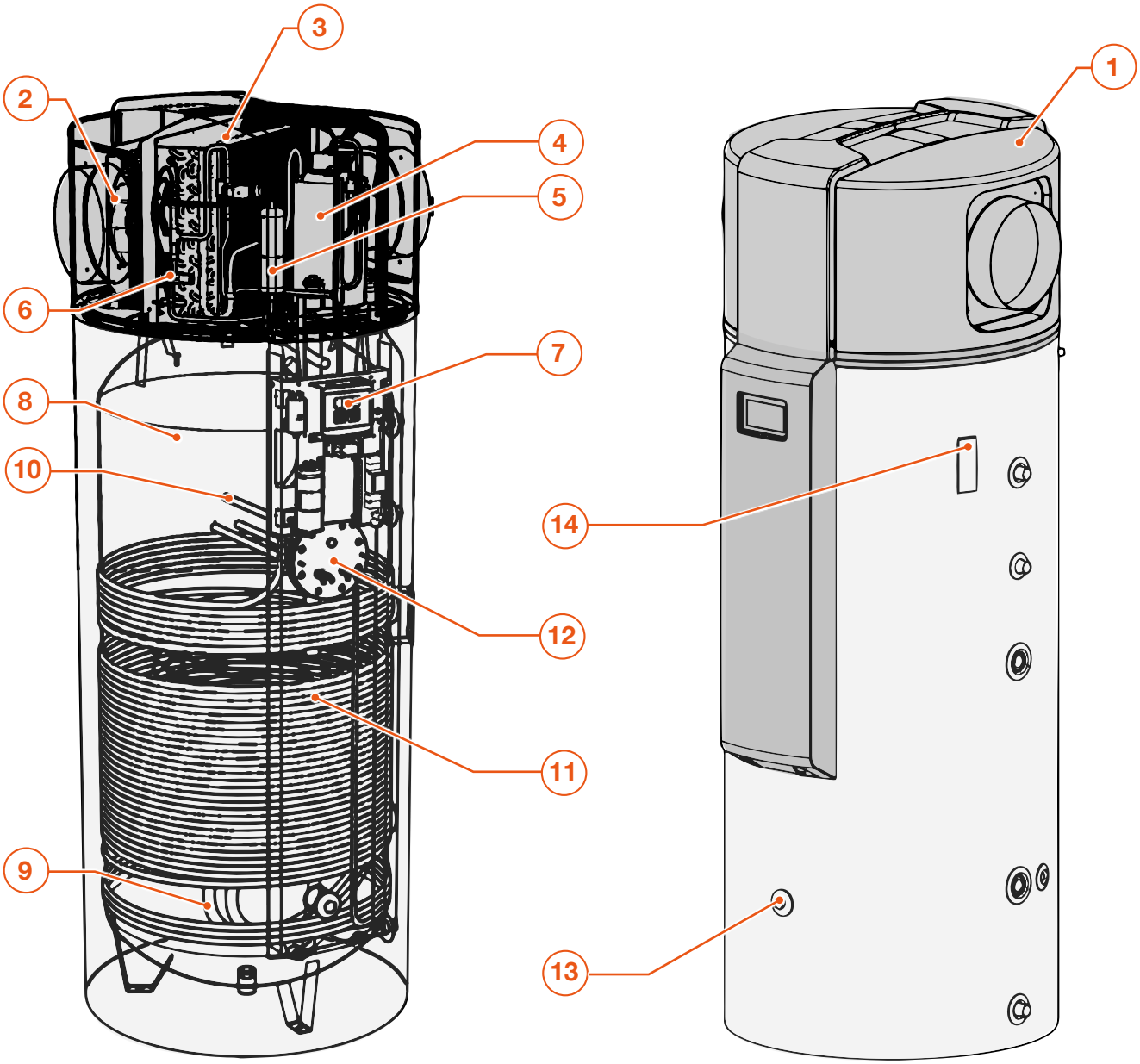
In the case of heating with a boiler or solar panels, the water in the hot water cylinder may be heated to a temperature above 75°C, causing the safety thermostat to switch off. In this case the thermostat must be reset manually. To restart the thermostat, call an authorised installer.

Boiler Water Temperature Control

Monitoring and heating of the water to the desired temperature is provided by the advanced OPTITRONIC 2 controller. In relation to the set desired water heating temperature, the controller switches the compressor and fan on or off as required, and under certain conditions also switches the heating element or boiler circulation pump on or off. The maximum water heating temperature that can be set is 65°C. If the temperature in the hot water tank rises above 75°C, the controller will switch off all heat sources for safety reasons. The minimum water temperature in the hot water tank is 7 °C.

High Pressure Cooling System Protection

To prevent excessive pressure in the refrigeration system and the associated potential damage, a high-pressure safety pressure switch was installed, which stops the heat pump from operating if the pressure rises above a preset point.



KEY

1. Device generator casing
2. Fan
3. Evaporator
4. Compressor
5. Dehydrator
6. Thermoexpansion valve
7. Controller
8. Domestic hot water tank (boiler)
9. Heat exchanger (heating water)
10. Anti-corrosion anode
11. Condenser
12. Heating element
13. Connection for additional heating element
14. Provisioned location for optional temperature sensor

Operation Principle

The cooling system of the heat pump is a closed circuit system, within which the coolant R134a circles as a heat exchanger. At lower pressure and lower temperature (e.g. 10°C), the coolant is vaporised in the heat pump vaporizer, thereby drawing heat from the air. Then, the coolant is compressed to a higher pressure in the compressor, which makes its temperature rise to the temperature, higher than that of the water in the boiler. The coolant then gives away the heat to the water in the condenser, whereby it liquefies. The expansion of the coolant, which makes the coolant pressure and temperature lower to the primary value, the circular process is concluded. This process is repeated throughout the heat pump operation time.

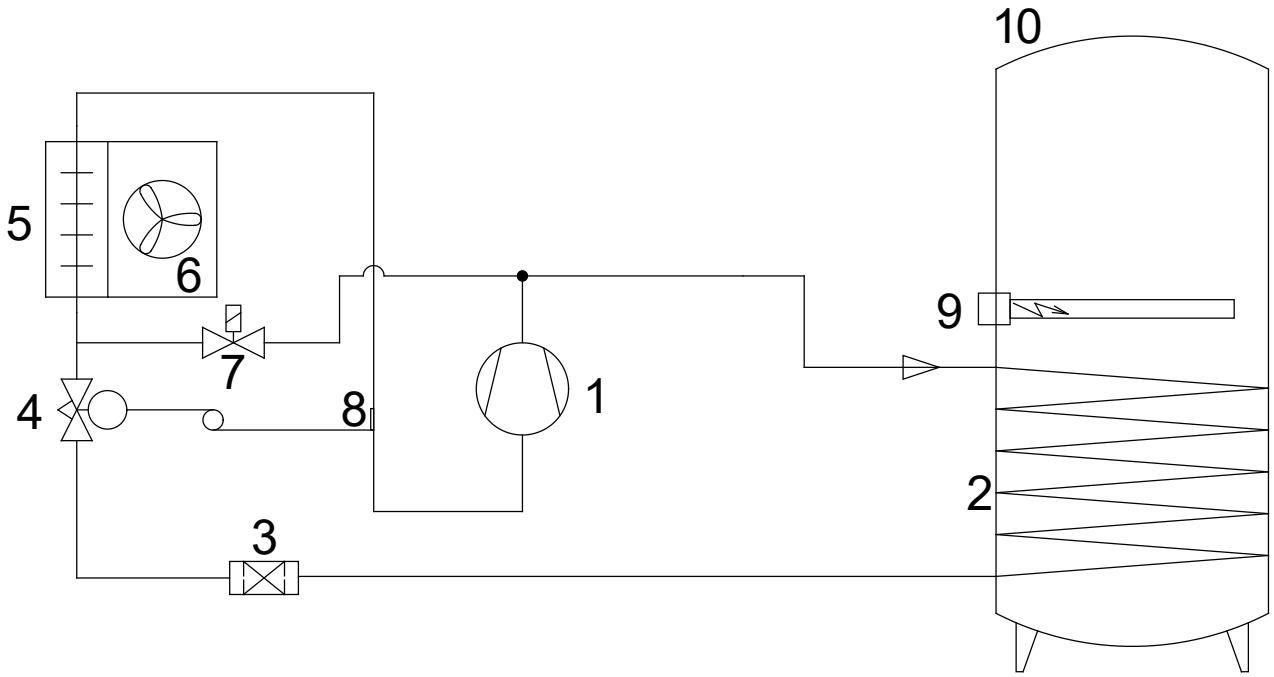


Fig. 2. Operation principle

KEY

1. Compressor
2. Condencer
3. Dehydrator
4. Thermoexpansion valve
5. Evaporator
6. Fan
7. Magnetic valve
8. Temperature bulb of the expansion valve
9. Electric heater
10. Hot sanitary water tank (boiler)

Control Panel and Main Functions

Fig. 3. Control Panel

KEY

1. **LCD Display** - The display contains the operating information, parameters, symbols, messages and menus. For a detail of the symbols and menus displayed on the screen, see **"Symbols and Functions on the Control Panel" on page G-12.**
2. **System status** - Indicates the current device oparation: modes, active programme, warnings etc.
3. **"Increase value" function key -** pressing that key begins increasing the desired temperature of sanitary water.
4. **"Decrease value" function key -** pressing that key begins decreasing the desired temperature of sanitary water.
5. **Sanitary water temperature -** displays currently measured sanitary water temperature.
6. **"Forward/confirm/menu" function key -** enables confirmation of new settings, entering submenus and leaving the screensaver view.
7. **"Back/screensaver" function key -** enables returning to main menu, as well as entering into screensaver window.

Symbols and Functions on the Control Panel

Icons in the System status area of the display (some of them will appear only if the function or circuit is enabled):

Operation of compressor and back-up source:

 Device generator heating sanitary water

 Back-up source programme active

 Device in standby

 Device in start-up mode

Alternative/additional source state:

 Internal heating element active

 External source active

 Internal heating element and external source active

Active programme:

 Anti-freeze programme active

 Defrosting programme active

 Quick water heating programme active

 Overheating (anti-legionella) programme active

 External input influencing operation

Warnings and errors:

 Warning

 Error

Operation mode:

 HOLIDAY programme active

 NORMAL programme active

 ECO programme active

 COMFORT programme active

 COMFORT PLUS programme active

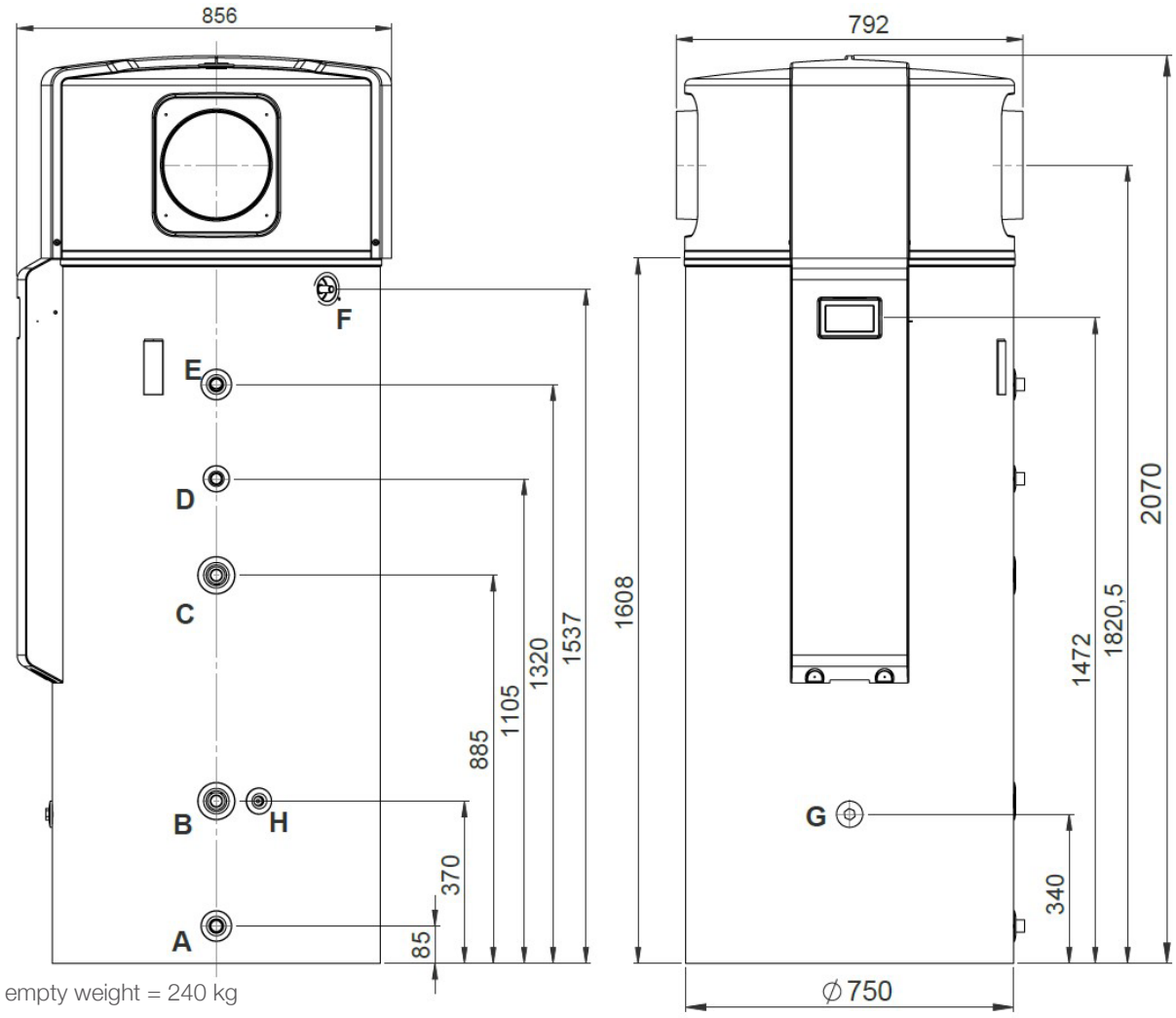
 ADDITIONAL SOURCE programme active

 OFF programme active

 PHOTOVOLTAICS (PV) programme active

Compressor is used for primary water heating. The compressor operates in a limited temperature area of entering air (from -7 °C to 35 °C). Outside this area, the controller shuts down compressor operation for safety reasons. The compressor may heat water to a maximal temperature of 65 °C.

Dimensions



connections (Ø)			
A	cold water inlet	in.	1
B	heat exchanger - return	in.	1
C	heat exchanger - supply	in.	1
D	circulation	in.	3/4
E	hot water connection	in.	1
F	water condensation removal	mm	16
G	additional electric heater	in.	6/4
H	cold water temp. measurement tube	in.	1/2

Clereances

- *Minimal spacing from the walls depends on the direction of entry and exit or air.*
- *In the case of using air heat from the same room where the device is installed, the room must be at least 50 m³.*
- *The minimum height of the room in which the unit is located should be 2,5 m.*

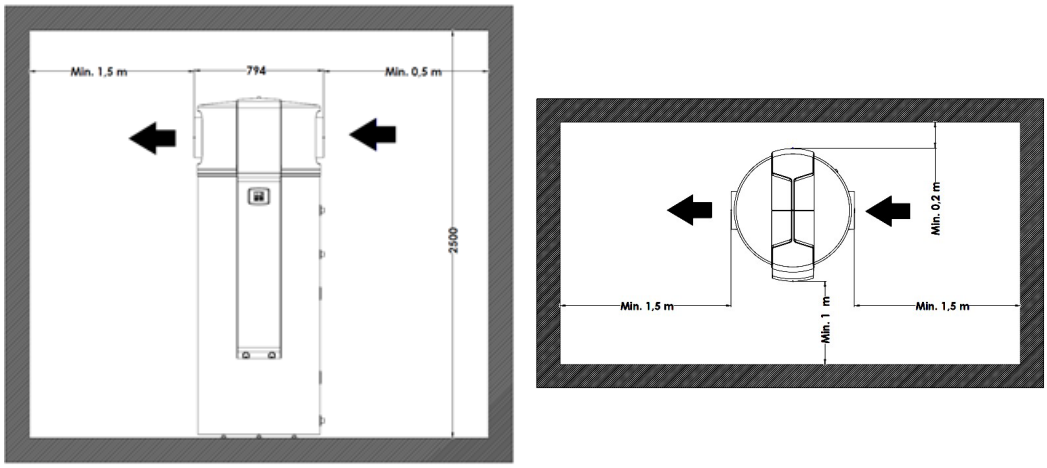


Fig. 4. Minimal clereances - in case of air intake from the same room

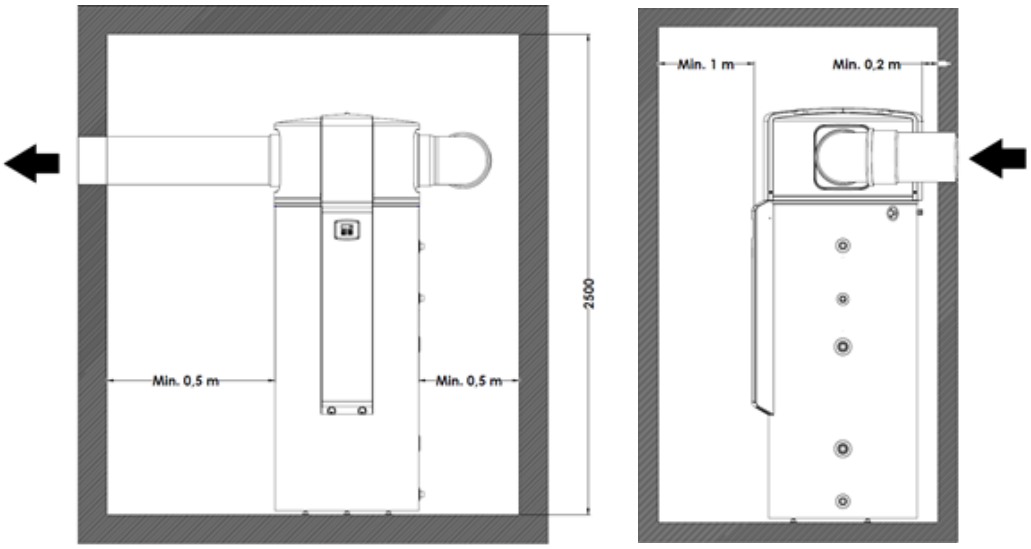


Fig. 5. Minimal clereances - in case of air intake from the environment

Performance and Efficiency Data		DYNAMIS MAX 450	
nominal heating power	W	7830[2] (3830[3] + 2 x 2000)	
device generator heating power	W	3830	
conditions		A20W10-55	A7W10-55
COP (EN 16147)		3,9	3,2
use in standby	W	35	37
referential water temperature	°C	52,7	52,9
quantity of mixed water (40°C)	l	578	582,5
exhaust profile		XXL	

Operational and Gas Data		DYNAMIS MAX 450
refrigerant type*		R134a
refrigerant charge	kg	1,8
global warming potential (GWP)		1430
equivalent CO_2 charge	t	2,574

The refrigerant data may change without notice. Always refer to the silver label placed on the unit.

Sound Data		DYNAMIS MAX 450
sound pressure level (Lp - i.a.w. ISO 3744)	dB (A)	49
sound power level (Lw - i.a.w. ISO 3744)	dB (A)	60

Electrical Data

		DYNAMIS MAX 450
supply voltage/frequency/fuses	V/Hz/A	230/50/16 230/50/25 3N~400/50/3x16
nominal electrical power	W	980
maximal electrical power	W	1506 / 3506 (1) / 5506 (2)
protection class		IPX1

(1) active electric heater (2kW)
(2) two active electric heaters (2x2kW)

Hydraulic Data & Operating Conditions

		DYNAMIS MAX 450
range of operation (water)	°C	10 - 65 (3)
range of operation (air)	°C	-7 - 35
nominal flow (air)	m^3/h	800
max. pressure permitted in the device	MPa	2,3

(3) 75°C with additional source

Water Tank Data

		DYNAMIS MAX 450
volume	l	450
highest allowed pressure (at 95°C)	MPa	1,0
volume of heat exchanger	l	11
highest allowed working pressure in heat exchanger (at 110°C)	MPa	1,0
surface of the heat exchanger	m^2	1,76

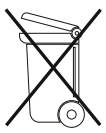
Safety Instructions for the User

- This appliance can be used by children who are at least 8 years old and by persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge, provided that they are under supervision or have been given instructions concerning the use of the appliance in a safe way and that they understand the hazards involved.
- Cleaning and user maintenance shall not be performed by children without supervision. Children shall not play with the appliance.
- Do not modify or deactivate any component, nor any safety device in the system.
- Do not install and use the unit in environments:
  - very dusty or with a potentially explosive atmosphere;
  - where vibrations are present;
  - presenting electromagnetic fields;
  - with aggressive atmospheres
- The unit contains potentially toxic and hazardous materials. Always wear personal equipment to protect the body and face.
- Follow all safety instructions and emergency procedures contained in this manual

- Do not modify any part of the electrical system or access internal components.
- Do not touch the appliance with any wet body parts when the appliance is supplied with electrical power.

- Do not open any sealed part or component. Failure to comply with this instruction can result in damages and/or injuries.
- Make sure that the unit and the water circuit are prevented from freezing.
- In case of leakage, disconnect the unit from the power supply and gas source, turn off the water supply and call a qualified professional.
- In case of abnormal noises in the system or the unit, please notify a qualified professional.
- Any setting of the unit by the end-user using the Service-specific functions, could cause the appliance to malfunction and result in damages to the equipment. Only the end-user settings described in this manual are available to the end-user.

Disposal of the Product at the End of Service Life

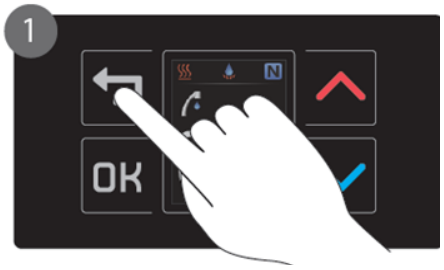


At the end of service life, the product should not be disposed of as solid urban waste, but should be handed over to a differentiated waste collection centre.

Operating the Controller - End User Level

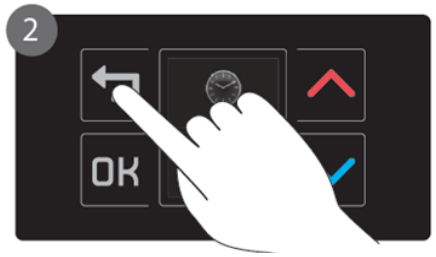
For the meaning of the icons and functions displayed on the screen, refer to **"Symbols and Functions on the Control Panel" on page G-12.**

Screensavers



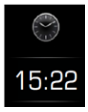
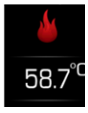
When the controller is not used, the screen displays screensavers. Those are meant for quick display of important heating system information. Presence of individual screensavers depends on the activities and individual functions, type of heat pump and presence of module Optitronic WEB Module.

Enter into screensaver window with ↩.

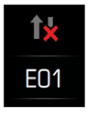


Move between windows with the key ↩.

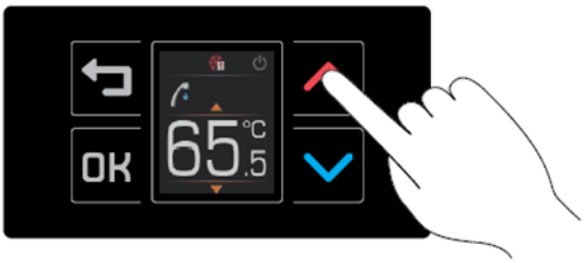
Exit from screensaver view with the key OK .

	display of device time
	display of external source temperature
	display of incoming air temperature
	display of system warnings/errors

Additional screensavers for built in Optitronic WEB module (option):

 	display of time and date
	display of connection status with the Water Cloud server
	display of local network connection status

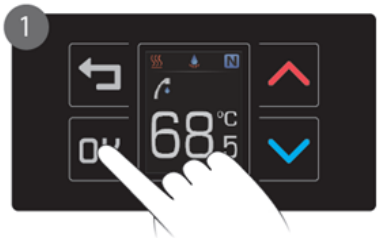
Setting of desired temperature of water



Currently set desired temperature is displayed on the screen.

By pressing the keys ^ or v the value is increased or decreased. To confirm change of desired sanitary water temperature, press OK.

Menu



Enter menu with the key OK.

Move between menus with ^ or v.

Use the key OK to enter desired submenu.

Use keys ^ or v to select desired setting in the submenu.

Use the key OK to confirm new setting. If you wish to cancel the change, use key ↩ to return to the menu.

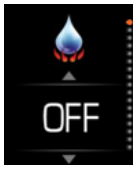
Error acknowledgement

In the case of one or several errors on the device, the menu displays a new setting “Error Acknowledgement”. After acknowledging an error, the device will restart and check if the cause of error has been removed. If the error has been removed, the setting “Error Acknowledgement” is not visible in the menu any more.

Enter “Error Acknowledgement” setting with the key OK.

Use key OK to acknowledge errors. The menu shows up again.

Quick water heating



The programme for quick heating is intended for one time quick water heating with the device and chosen additional heat source at the same time. After achieving a temperature, the quick heating programme switches off and changes to previous operation mode. The programme is started by selecting the setting **START**.

Time setting

Manual setting of time on the device.

▷ *In case that your device has the Optitronic WEB module (option) installed and is connected to the server Water Cloud, the time and date of the device are automatically synchronised with the server Water Cloud.*

Basic operation programme

Using direction keys ∧ and ∨ select between basic device operation programmes. Confirm selection with the key OK .

Additional operation programmes such as "Quick water heating", "Daily schedule", "Vacation" etc. have priority over basic operation programmes.

Symbol	Operation programme
	NORMAL
	ECO
	COMFORT

Symbol	Operation programme
	COMFORT PLUS
	OFF
	ADDITIONAL SOURCE

Temperature deviations

In the **ECO** operation programme, the device heats water to desired temperature while considering a negative deviation. The desired deviation is chosen with keys ∧ and ∨. Setting is confirmed with the key OK.

Setting range: 0 °C – 15 °C.

Setting step: 0,5 °C.

In the **COMFORT** operation programme, the device heats water to desired temperature while considering a positive deviation. The desired deviation is chosen with keys ∧ and ∨. Setting is confirmed with the key OK.

Setting range: 0 °C – 15 °C.

Setting step: 0,5 °C.

Daily schedule

A change of operation programme can be automatic by setting up a daily schedule. Every daily schedule may have two time intervals. Every interval has a set starting time, ending time, and programme of operation. In the time outside the set intervals of the schedule, the device operates according to basic programme.

Enter schedule setting with the key OK.

Turn schedule ON or OFF.

Set starting time of schedule interval.

Set ending time of schedule interval.

Set operation programme in the time of interval.

Backup source

Manual activation and deactivation of the programme Backup Source.

Weekly schedule (optional)

The schedule may be set for every day in the week separately. Every daily schedule can have up to three time intervals. Every interval has a set starting time, ending time, and programme of operation. In the time outside the set intervals of the schedule, the device operates according to the basic programme.

To set and operate weekly schedules, the device needs to be equipped with the Opritronic WEB module (optional).

Enter schedule setting with the key OK.

Pick the day of the week (1-Monday, 7-Sunday).

Turn schedule ON or OFF.

Set starting time of schedule interval.

Set ending time of schedule interval.

Set operation programme in the time of interval.

Ventilation schedule (optional)

The devices with guided air, along with sanitary water heating, also enable cooling and ventilation of rooms. Ventilation functions according to set intervals of a ventilation schedule with set start and end times.

To set and operate ventilation schedules, the device needs to be equipped with the Opritronic WEB module (optional).

Enter schedule setting with the key OK.

Turn schedule ON or OFF.

Set starting time of schedule interval.

Set ending time of schedule interval.

Overheating programme (Anti-Legionella)

Programme heats water to 65 °C, to remove potential legionella bacteria. Activation can be automatic or manual.

Factory preset overheating is automatic every 14 days. We advise against overheating too often, as energy consumption during overheating is 1/3 higher than during normal operation.

Vacation

The vacation programme allows us to shut down the device for a specific number of days when we know we will not require hot water. In this period, no programme is active, even if it's set on a schedule. When the set time interval passes, the device automatically switches back to basic operation programme.

In the case that the vacation programme was activated and in operation at least for 1 day, the overheating programme will activate after the ended vacation programme.

Enter vacation setting with the key OK.

Turn vacation programme ON or OFF.

Set number of days (duration) of vacation programme.

Automatic quick water heating

Programme "Quick water heating" (chapter 8.3.2) can be triggered automatically when water temperature falls below the set value.

Enter setting with the key OK.

Turn programme ON or OFF.

Set temperature at which the "Quick Water Heating" programme activates.

Device operation setting

Basic operation programmes

NORMAL: For heating water to desired temperature, the device uses the primary heat source (compressor) whenever it is possible. When the primary heat source, due to conditions (e.g. entering air temperature) can not provide enough power, the device adds the additional power source (e.g. electric heater) to aid in water heating.

ECO: Water is heated to desired temperature, with a considered negative deviation ECO. The final water temperature is lower than in the NORMAL mode. ECO deviation setting can be found in the user menu.

COMFORT: Water is heated to desired temperature with a considered positive deviation COMFORT. The final water temperature is higher than in the NORMAL mode. COMFORT deviation setting can be found in the user menu.

COMFORT PLUS: Water is heated to desired temperature with a considered positive deviation COMFORT. Water is heated by generator of the device and internal electric heater at the same time. COMFORT PLUS programme may be stated manually, automatically or via external input.

OFF: The device is off.

ADDITIONAL SOURCE: The water is heated to the set temperature of the additional source with a chosen additional source. The type of the additional source is important and thereby the setting of the mode of operation of the additional source and a possible connection of the temperature sensor of the external source.

Additional source

For the functioning of the backup source, the following must be done correctly:

- Choosing the type of backup source,
- Choosing the operation mode of the external source,
- Making an electrical connection between the external source and
- If needed, connecting the temperature probe of the external source.

The backup source can be triggered automatically by the air temperature outside the operating range of the device's generator or possible malfunction of the device's generator or by choosing the differential operation of the backup source or the backup source can be triggered manually by choosing the operation among the basic operation programmes or the schedule or by the external signal. Heating with the additional source can also be triggered when the combined programmes "Quick water heating", "Comfort plus" and "Automatic quick water heating" are activated.

Backup source

In case of a malfunction on the device's generator, the device automatically goes into temporary operation in some cases. Water is heated with the chosen additional source or internal electric heater up to the temperature of the Anti-freeze programme (35 °C).

In case we want to have the water heated up to the temperature defined by the basic programme despite the malfunction in the generator, the backup source programme (electric heater) must be chosen manually. This ensures temporary operation for the period until the arrival of a qualified service company and the correction of the error.

Quick water heating

The quick water heating programme is intended for quick water heating with the device generator and selected additional source at the same time. After reaching the set temperature, the quick heating programme turns off and switches back to previously set operation mode.

Quick water heating programme may be stated manually, automatically or via external input. Operation differs in regards to the set additional source:

- **Internal electric heater**: Water is heated by generator of the device and internal electric heater at the same time.
- **External source**: Water is heated by generator of the device and external source (if available).
- **Internal electric heater + external source**: Water is heated by generator of the device, internal electric heater and external source (if available)
- **Off setting**: Water is heated only by generator of the device.

The temperature to which the water is being heated by the programme of quick heating depends on the programme in which the device operates:

- **Basic operation programmes**: Water is heated to temperature, defined by programme COMFORT.
- **Additional source programme**: Water is heated to temperature, defined in the menu SETTINGS OF EXTERNAL SOURCE TEMPERATURE.

Anti-freeze programme

The anti-freeze programme is activated automatically and ensures that, in the case of a compressor defect, the system does not freeze.

The water heating programme uses heat from the selected additional source.

If additional source is not selected, or external source is not available, the programme will activate internal electric heater.

Photovoltaics

The programme photovoltaics (PV) is a programme of device operation which heats water with excess electrical power, obtained through a solar photovoltaic system. The programme activates when the device receives a PV signal via external input.

When the PV signal is present, the device generator heats water to maximal work margin of the compressor temperature (65°C), and from there on to the set temperature of the programme photovoltaics, water is heated by the internal electrical heater.

If the external source is mounted to the heat pump, the external source will be used for heating when it is available.

Defrost programme

At low air temperatures, frost forms on the evaporator which lowers the efficiency of the device's operation. To thaw the frost, the controller activates the defrost program.

The device's generator is activated during defrosting but it defrosts the evaporator instead of heating water. During defrosting, heating the DHW is performed by the electric heater.

The fan is turned off during defrosting.

The operation of the ventilation schedule programme is disabled during the "Defrost" programme.

Bivalent mode programme

The power of the device at an air temperature of below 3 °C is reduced, this is why to achieve quick water heating, the chosen additional source activates together with the compressor.

The bivalent mode program turns off when the air temperature is above 6 °C for 30 min.

Safety Instructions for the Installation

- All connections must be carried out in accordance with current standards and regulations in force.
- Choose an installation site in accordance with standards EN 378-1 and 378-3 and take into consideration risks caused by accidental refrigerant leakage.
- Do not install and use the unit in environments:
  - very dusty or with a potentially explosive atmosphere;
  - where vibrations are present;
  - presenting electromagnetic fields;
  - with aggressive atmospheres
- Do not install the appliance in a location where chemical vapours or dust are present in the ambient air.
- Make sure to install all required external components to ensure the correct operation of the system.
- Before the installation, make a complete check of the unit for possible refrigerant leakages due to bad transport conditions.

- When the unit is connected to the electrical network, it must be earthed.
- Make sure that a fuse or circuit breaker of the recommended rating is installed outside the unit, so as to be able to shut the power down.
- Do not touch the unit with any wet body parts when it is supplied with electrical power.
- Before performing any operation on the electrical circuit, isolate the electrical supply of the appliance through the external power-cutting device (fuse, circuit breaker, etc.)

- The unit is designed for indoors installation.
- Comply with the clearance dimensions provided in this manual.
- Make sure to protect the unit and the circuits against freezing.
- The unit must be installed to ensure easy access at all times.
- Use an appropriate means of handling, suitable to the unit size and weight.
- Install all pipes and ducts without stress to prevent any leaks from occurring.

Handling the Unit

- **This unit is heavy and requires adequate means of handling and transport. Make sure to comply with applicable local standards and regulations on product handling.**
- **Units can be lifted with a forklift, making sure not to damage the covers.**
- **During the handling process, keep the unit vertical at all time to avoid damage to the internal component.**
- **Also avoid sudden movements in order to protect the refrigerant circuit and other components.**
- **Failure to comply with these recommendations can result in damage to the unit or injuries to the personnel**
- **The device must be stored in a dry and clean area. Allowed storage temperature is between 10 and 45 °C, short term (up to 24 hours) also up to 55 °C.**

Safety requirements : 

Using an appropriate lifting means, move the unit in its packaging close to the installation location.

Unpacking the Unit

Safety requirements : 

The unit is packaged with different materials such as cardboard, foil, etc.

1. Carefully remove the packaging.
2. Discard packaging according to applicable local regulations.

Installing and Preparing the Unit

Safety requirements : 

Make sure to comply with the recommended clearances for the unit installation.

- **Make sure to comply with all the safety instructions for the installation, as defined on the previous page.**
- **The device must be in a vertical position during operation to prevent potential leaking of water condensation.**
- **The device must be levelled at 90° to the ground.**
- **The minimum height of the room in which the unit is located should be 2,5 m.**
- **If the heat exhanger (heating water) in the water tank is not used for water heating, it must be filled with an anti-freeze liquid (propylene glycol), to prevent corrosion in the exchanger.**

For the all installation options, please refer to **"Possible installation options" on page G-31.**

Possible installation options

The device is made so that it takes heat from surrounding air or sucks it through air channels and blows it into neighbouring rooms or the environment. The device may be installed in the following ways:

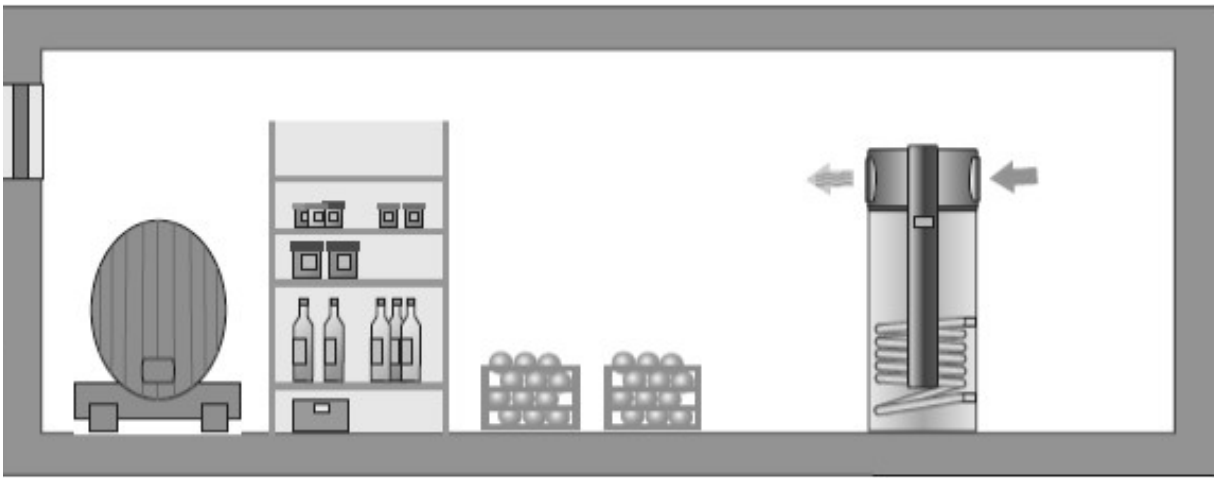


Fig. 6. Installation options - suction and exhaust in the same room (e.g. pantry cooling)

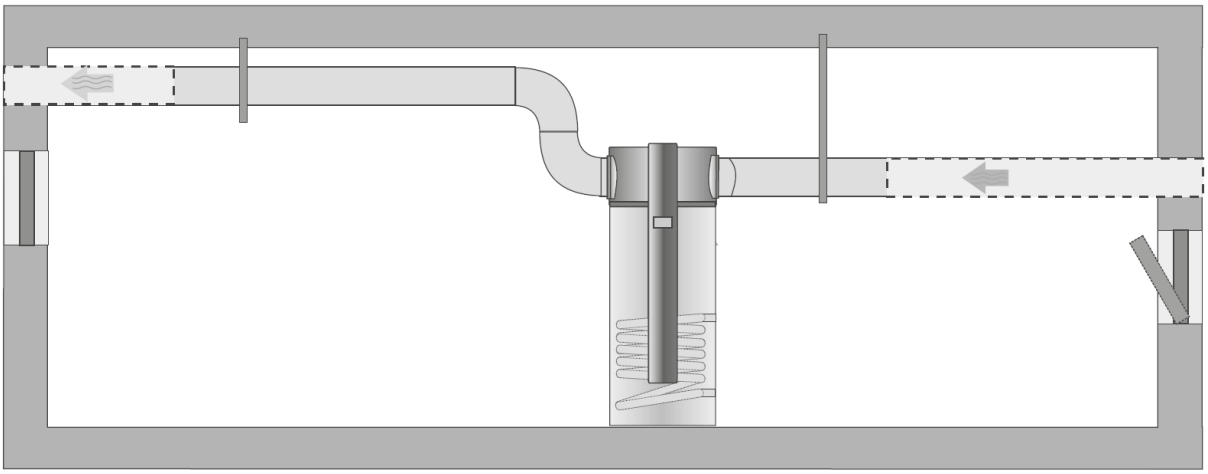


Fig. 7. Installation options - suction of the outside air, exhaust into the surroundings

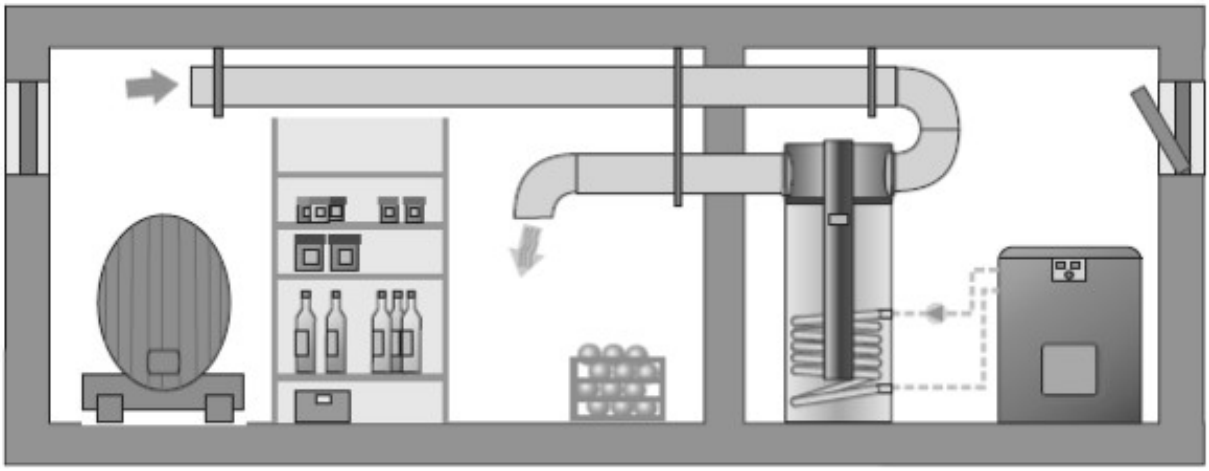


Fig. 8. Installation options - suction and exhaust into neighbouring room (e.g. pantry cooling)

Safety Instructions for the Hydraulic Connections

Primary Circuit

Make sure that the circuit is provided with a safety pressure relief valve and an expansion vessel that is appropriate for the the system size and unit power, and the increase in temperature and pressure.

- No isolating valve may be installed between the appliance and the safety valve. The safety valve drainage must be connected into a pipe with a diameter no less than that of the valve itself.
- If the supply pressure from the network is higher than 6 bar, make sure to install a pressure reducing valve set at 6 bar.
- Verify the water quality of the network according to the requirements defined in this manual. The quality of water must comply with the European Council Directive 98/83/EC.
- The heating system must be filled with water of a hardness between 5 °dH and 10 °dH . Device defects due to unsuitable heating water hardness are not covered by warranty

- *The circuit diagrams are theoretical representations that do not necessarily include all the required safety devices. Make sure to correctly plan your system according to the applicable local regulations and standard practices.*

Domestic Hot Water Circuit

- Make sure that the circuit is provided with a safety group. It must be composed of a safety valve set at 6 bar, a check valve and a stop valve.
- The hot water produced in the circuit can reach temperatures higher than 60°C and cause scalding when drawn from a tap. The installation of a thermostatic mixing valve is therefore recommended.

- For proper operation of active anti-corrosion protection, the DHW tank (boiler) must be filled with water, the conductivity of which is at least 200 µS.
- The supply pressure from the network must be comprised between 0,8 and 6 bar. If the pressure is higher than 6 bar, a pressure reducing valve set at 6 bar must be installed.
- For proper operation of an expansion vessel, a suitable setting of the operational pressure of the tank must be made. The pressure is set in regards to the pressure in the plumbing. The setting needs to be checked every 6 months.
- Verify the water quality of the network according to the requirements defined in this manual. The quality of water must comply with the European Council Directive 98/83/EC.
- Flush thoroughly the circuit before operation.

- *The installation of an expansion vessel in the DHW circuit is recommended to prevent the water hammer effect in the pipework and the frequent opening of the safety valve.*
- *To prevent the development of the bacteria Legionella Pneumophilia in the DHW circuit, it is recommended to either activate the antilegionella function of the unit (if any) or to increase regularly the DHW circuit temperature to 70° for a short period.*
- *The circuit diagrams are theoretical representations that do not necessarily include all the required safety devices. Make sure to correctly plan your system according to the applicable local regulations and standard practice.*

Requirements for the Hydraulic Connections

- **Install the water pipes in accordance with national and local regulation.**
- **Pipes can be made from copper, steel, galvanized steel or PVC.**
- **Due to use of different materials on the pipe installation, all connections (cold water, hot water, circulation, heat exchanger) on the device must obligatorily be galvanically isolated, or the corrosion of connections within the heat storage may occur.**

The hydraulic piping should includes:

- Temperature and pressure gauges for maintenance and servicing operations
- Shut-off manual valves to isolate the unit from the hydraulic circuit
- Vent valves, expansion tank with water filling, discharge valve
- Metallic filters to be mounted on the inlet pipe with a mesh not larger than 1 mm

Requirements for water content

Type of substance	Unit	Concentration	Influence on heat exchanger
Organic sediments	mg/L		0
Ammonia NH3	mg/L	< 2	+
		1 do 20	0
		> 20	-
Chloride	mg/L	< 300	+
		> 300	0
Allowed water hardness	°dH	5–10	
Electrical conductivity	µS/cm	< 10	0
		10–500	+
		> 500	-
Iron (Fe) separate	mg/L	< 0,2	+
		> 0,2	0
Free carbonic acid	mg/L	< 5	+
		5–20	0
		> 20	-
Manganese (Mn) separate	mg/L	< 0,1	+
		> 0,1	0
Nitrates (NO3) separate	mg/L	< 100	+
		> 100	0
pH value	mg/L	< 7,5	0
		7,5–9	+
		> 9	0
Oxygen	mg/L	< 2	+
		> 2	0
Hydrogen sulphide (H2S)	mg/L	< 0,05	+
		> 0,05	-
HCO3- / SO42-	mg/L	> 1	+
		< 1	0
Hydrogencarbonate (HCO3-)	mg/L	< 70	0
		70–300	+
		> 300	0
Aluminium (Al) separate	mg/L	< 0,2	+
		> 0,2	0
Sulphates	mg/L	< 70	+
		70–300	0
		> 300	-
Sulphite(SO3)	mg/L	< 1	+
Chlorine (gas) (Cl2)	mg/L	< 1	+
		1–5	0
		> 5	-

Maximal allowed content of individual substances in heated water and their influence on the heat exchanger are shown in the table below. The heated water which includes any substance in a concentration which causes corrosion (influence "-") in the heating system is forbidden. The heating water which contains two or more substances in a concentration, which may cause corrosion (influence "0") in the heating system is also forbidden.

Typical Systems

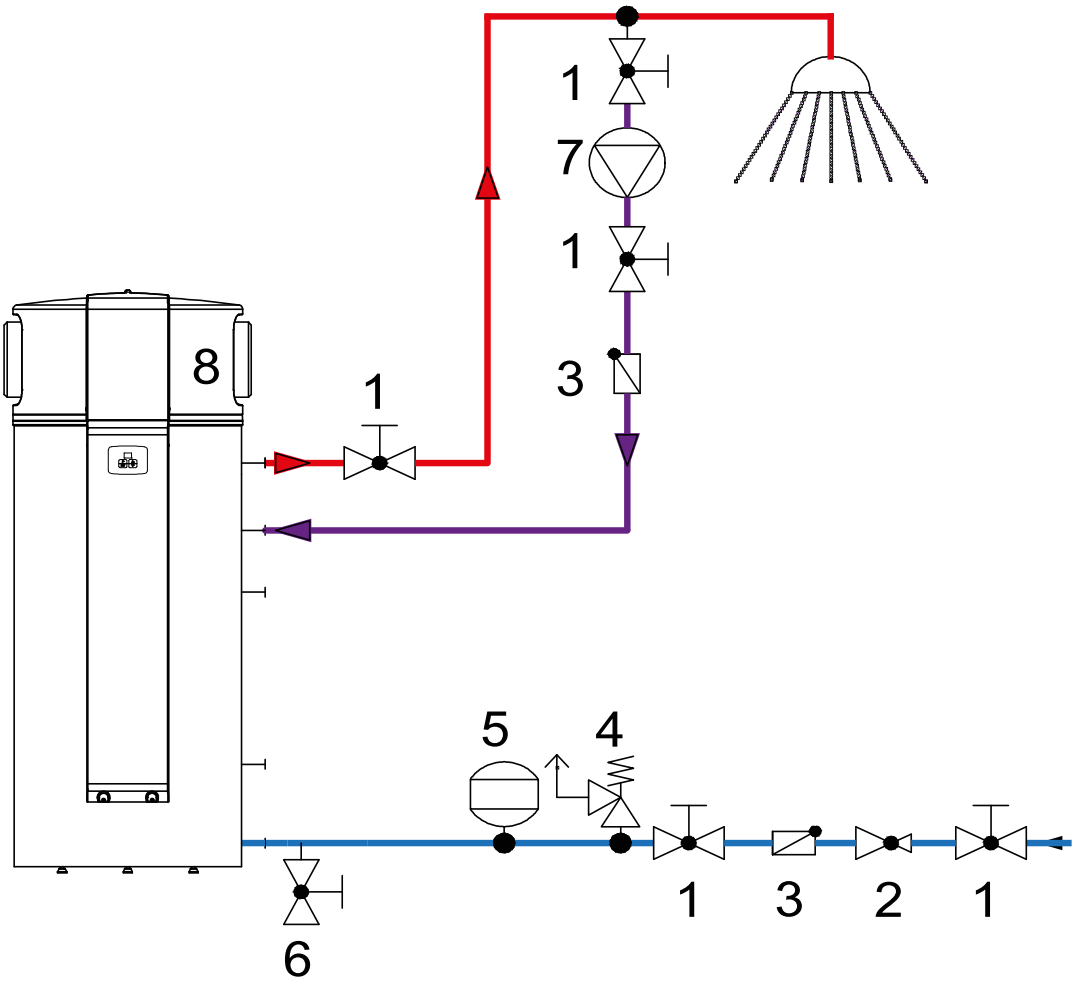


Fig. 9. Typical hydraulic connections

KEY

1. Ball valve
2. Pressure reducing valve
3. Check valve
4. Safety valve
5. Expansion vessel
6. Drain tap
7. Circulation pump
8. Device generator

For proper operation of expansion vessel, a suitable setting of the operational pressure of the tank must be made. The pressure is set in regards to the pressure in the plumbing. The setting needs to be checked every 6 months.

Water used for sanitary water heating through the installed heat exchanger in the hot sanitary water tank must comply with requirements of standard VDI 2035. The heating system must be filled with soft water, which contains anti-corrosive and anti-bacterial substances for prevention of corrosion. Before filling, the heating system must be cleaned of all impurities. It also has to be thoroughly drained of all air. Prevent the intrusion of air into the system, including diffusion air.

Air Pipe Installation

The device has attachments on left and right for the attachment of air canals, which enables:

- the placement of the device into any room which is spacious enough
- ventilation of desired room
- exhaust of waste air or intake of fresh air from the environment

In the case of air canal use, keep in mind that air pipes and every additional elbow represent additional air resistance and lesser capacity of the device. The table shows maximal permitted canal lengths. Air canals must be isolated to prevent water condensation on the pipe surfaces.

The final length of air canals needs to take into consideration also the equivalent length of accessories such as knees, reduction pieces, etc.

Air canal		max length
Diameter 200 mm	m	10
Diameter 250 mm	m	15

Accesories		equivalent length
Elbow 90° (Ø 200 mm)	m	3
Elbow 90° (Ø 250 mm)	m	2
Reduction piece Ø250 x Ø200	m	1
Wall blind	m	2

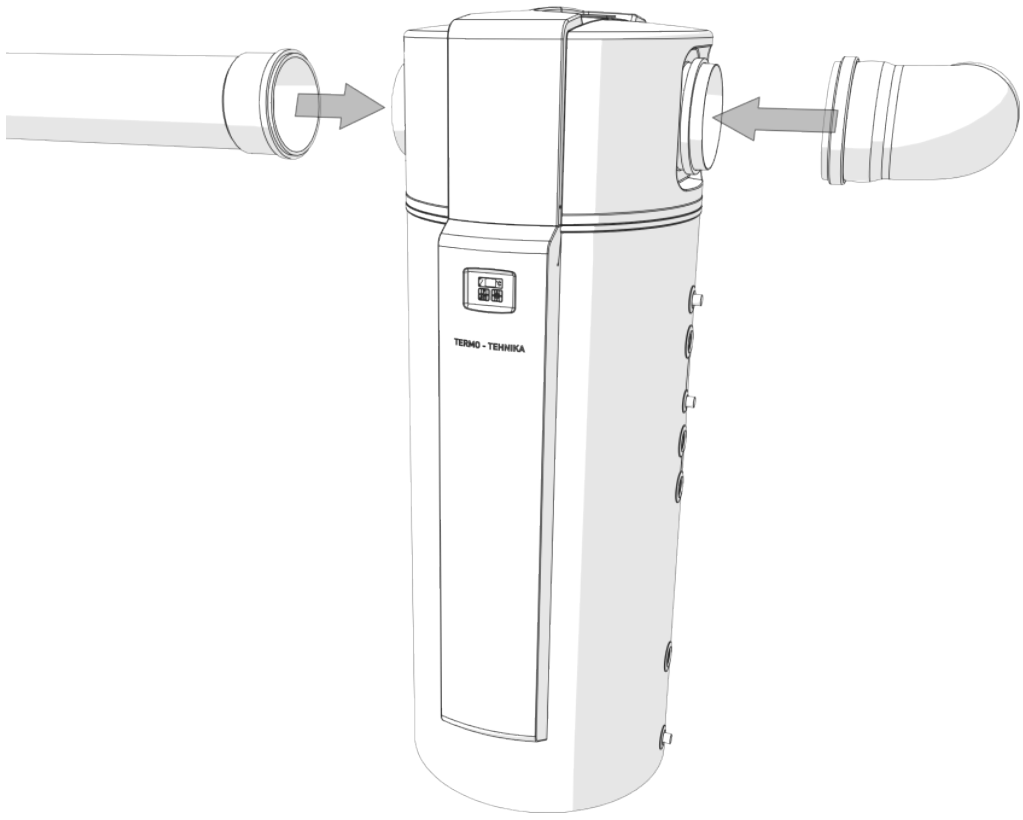


Fig. 10. Air canal installation

Connection of condensation outlet

By removing heat from air, condensation of air moisture also occurs in the heat pump. Depending on air temperature and relative air humidity, the production of moisture from air varies. In some cases, no moisture will be removed from air and in others, up to 10 litres of condensed water may be produced.

When installing a condensation outlet, make sure that the pipe is always at a downwards incline with a siphon and water pillar of at least 5 cm at the outflow. This prevents the suction of unpleasant odours from outlets.

The water condensation outlet pipe must be laid in a way, where the water may always freely flow out. When connecting outlet pipe to the drain is not possible, ensure a collection canister, which must be regularly emptied.

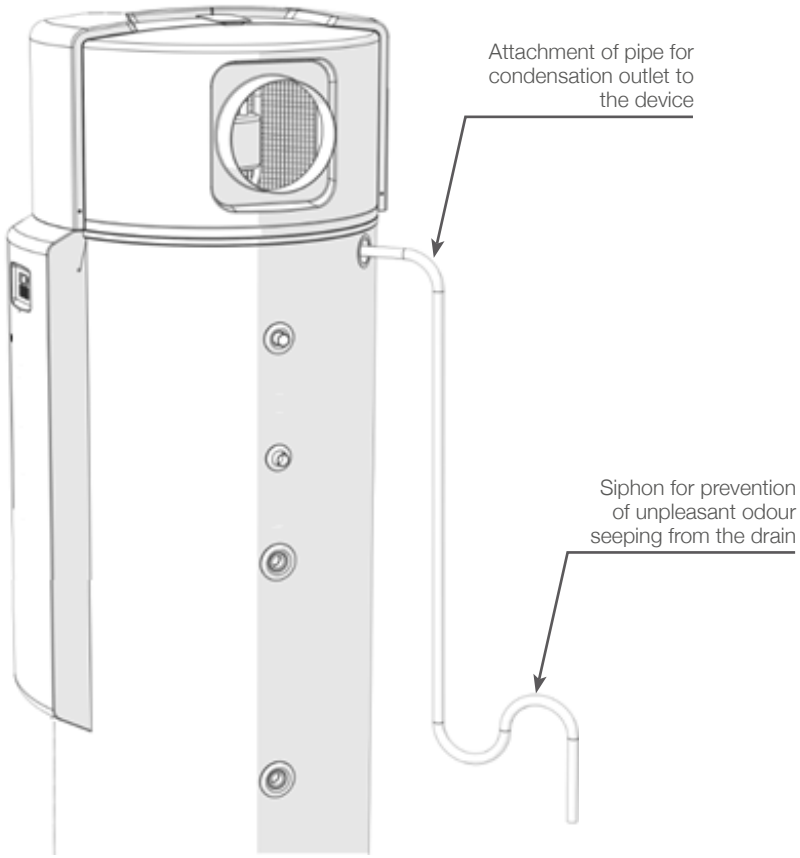


Fig. 11. Condensation outlet connection

Placement of External Controller Temperature Probe

In the case of use an external controller of additional source, attach temperature probe of the external controller into the appropriate canal on the right side of the device, under the black plastic cap (A), as marked on the image.

B connection (½") is intended for installation of the watertight tube of an additional sensor for the measurement of cold water temperature in the device. The connection is used in applications where the temperature of the entire water heater volume must be checked with an external controller.

To ensure a safe and efficient operation of the additional heat source for the preparation of sanitary water (boiler, solar collectors), the controller of the external source needs to be set to a limit of water heating of max 75 °C. It is recommended to set the temperature at 65 °C or less.

The highest permitted water temperature in the heat exchanger is 110 °C.

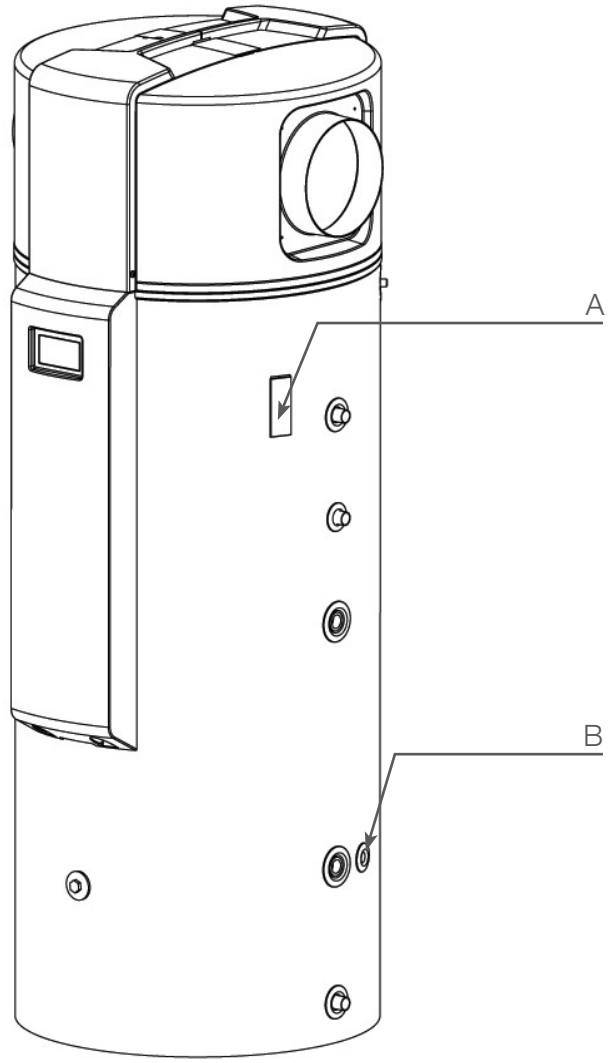


Fig. 12. Temperature probe canal on the right side of the device

Connection of External Heating Source

Sanitary water in the water storage tank may be heated with the device generator - heat pump (primary source) and / or additional heat sources (serially equipped heating element or various external sources).

The external source is a source, which produces heat separately from the device and is connected to the device through a pipe heat exchanger inside the DHW tank. External heat sources are considered those which are available at all times (additional external electric heater, fuel oil/gas/pellet/biomass boiler) or those which are at disposal only occasionally (solar panels, wood-fired furnace, fireplace, etc.).

If a temperature sensor is installed into the external source the regulation checks the temperature of the external source and adjusts the activation of the external source circulation pump according to the need for domestic hot water and according to the temperature of the external source. For proper functioning you must connect the circulation pump and the temperature sensor correctly and set the parameters in the device controller.

For a proper electrical connection of the attachments follow the instructions in the chapter about the electrical connection, and for the setting of the controller, the chapter on operation.

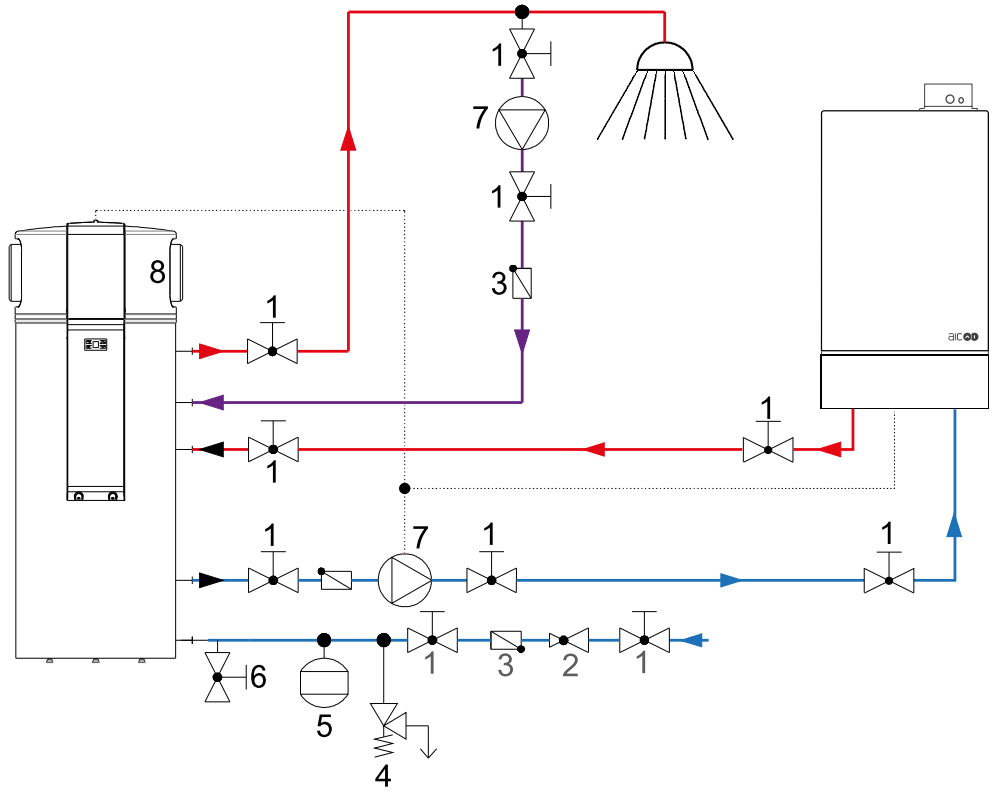


Fig. 13. Heat pump combined with a boiler

1. Ball valve
2. Pressure reduction valve
3. Check valve
4. Safety valve
5. Expansion vessel
6. Drain tap
7. Circulation pump / 7.1 Circulation pump (SET SOLAR)
8. Device generator
9. Furnace
10. Heating water hopper
11. Solar energy collector

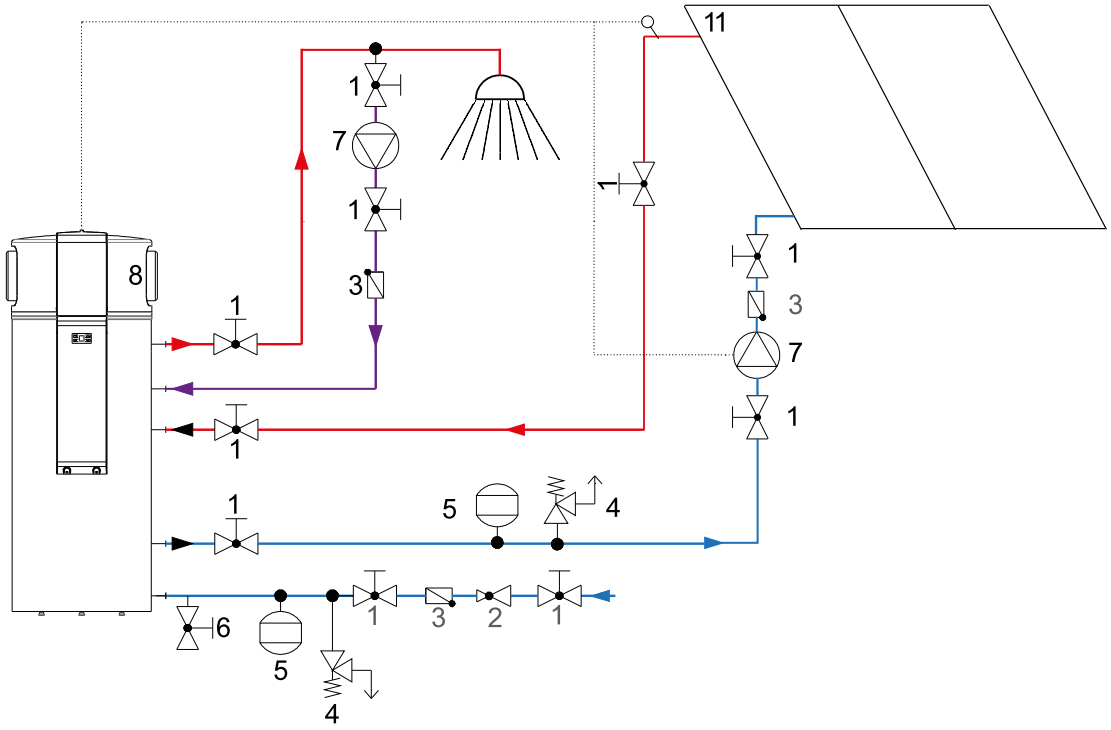


Fig. 14. Heat pump combined with solar collectors

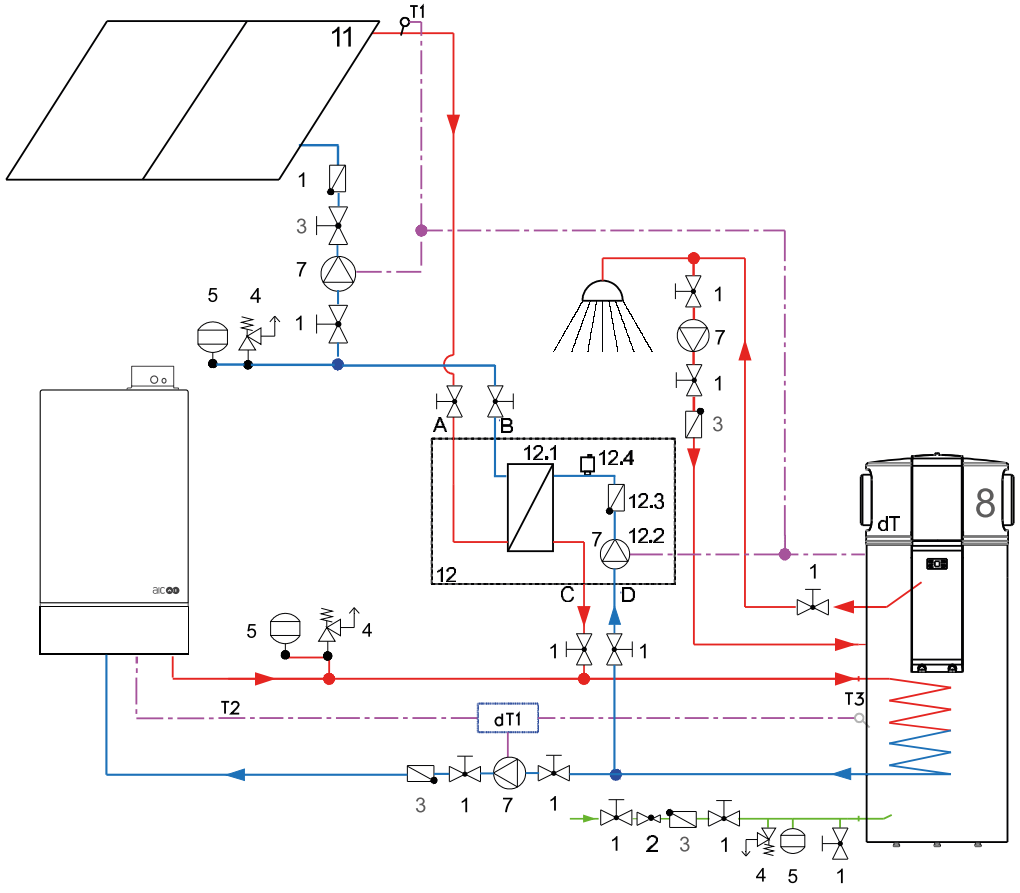


Fig. 15. Heat pump combined with solar collectors and boiler (SET SOLAR)

Safety Instructions for the Electrical Connections

Electrical connections must be carried out by a qualified professional in accordance with current standards and regulations in force.

- When the unit is connected to the electrical network, it must be earthed.
- Make sure that a fuse or circuit breaker of the recommended rating is installed outside the unit, to allow electrical isolation.
- Do not touch the unit with any wet body parts when it is supplied with electrical power.
- Before performing any operation on the electrical circuit, isolate the electrical supply of the unit through the external power-cutting device (fuse, circuit-breaker, etc.)
- When routing the cables through sharp-edged holes in the panels, make sure to install glands or grommets, and to secure the cables in order to prevent any damage.

- When connecting wires to the terminals, check that the connection is secure and that all the cable strands are tightly held.

Electrical connection

Electric connection of the supply cable, external signal, additional temperature probe, and additional heater is done under the cover on the front of the device. To access electrical connections the front cover must be removed as shown below:

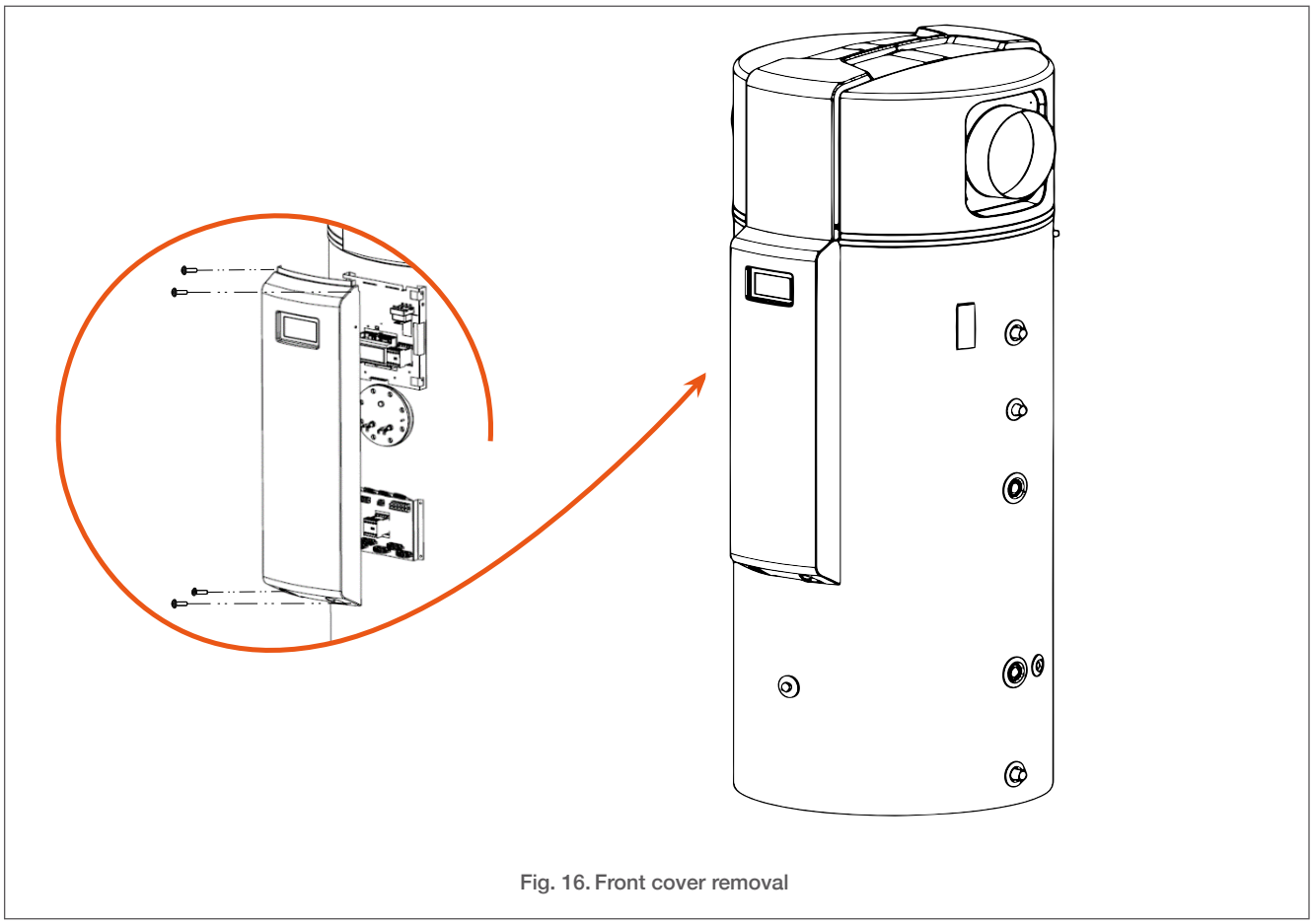


Fig. 16. Front cover removal

- **The device must be connected to the electricity supply where the RCD (FID) switch of type A is installed.**

Power supply

- *The terminals mentioned below are to be found in the electrical box and connections shall be performed by qualified personnel on site.*
- *With all three connection types, the pin ⏚ is used for earthing, and the pin N for a neutral lead.*

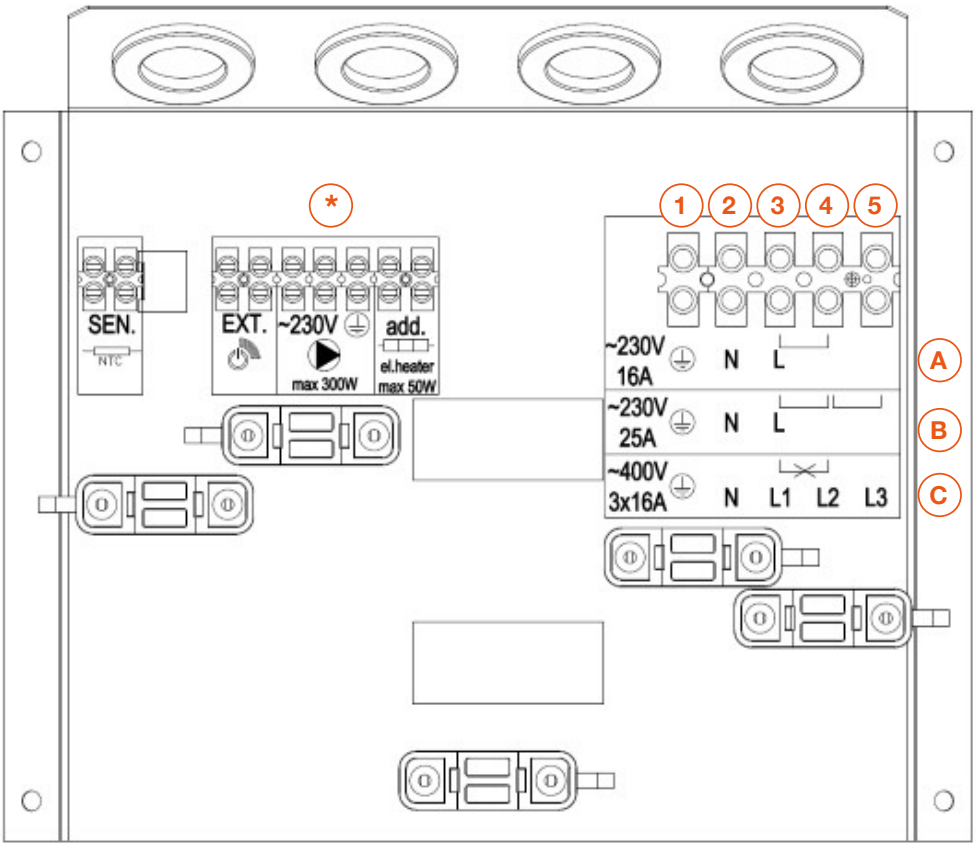


Fig. 17. Connection pin holder

Terminals	Connections	Description
Power supply		
area (A)	Single-phase connection with maximal current load of 16 A	This connection is used when single-phase power supply with 16 A fuses is available. In this connection type connect power supply phase to pin (3). This is connected to pin (4) with a bridge (factory connection). This connection enables the operation of device generator and the first installed electric heater (2 kW). The second heater is not active in such a case. Supply cable needs to have a circumsection of 3 x 2,5 mm2. Maximal total electrical power for this connection is 3,5 kW.
area (B)	Single-phase connection with maximal current load of 25 A	This connection is used when single-phase power supply with 25 A fuses is available. In this connection type connect power supply phase to pin (3). This is connected to pin (4) with a bridge (factory connection). To connect the second electric heater (2 kW) it is necessary to additionally connect the bridge between connection pins (4) and (5). This enables the operation of the device generator and both installed electric heaters (2 x 2 kW). Supply cable needs to have a circumsection 3 x 4 mm2. Maximal total electrical power for this connection is 5,5 kW.
area (C)	Three-phase connection with maximal current load of 3x16 A	This connection is used when three-phase power supply with 3x16 A fuses is available. In this type of connection, every phase is connected to an individual pin ((1), (2), (3), (4) and (5)). This enables the operation of the device generator and both installed electric heaters (2 x 2 kW). Supply cable needs to have a circumsection 5 x 2,5 mm2. Maximal total electrical power for this connection is 5,5 kW.

In three-phase connection, it is obligatory to remove the bridge which is factory placed and connecting pins (3) and (4).

Additional heat source connection

Left connection pin (marked on the connection pin holder as (*)) is intended for the connection of the circulation pump, external switch and temperature probe of the external source.

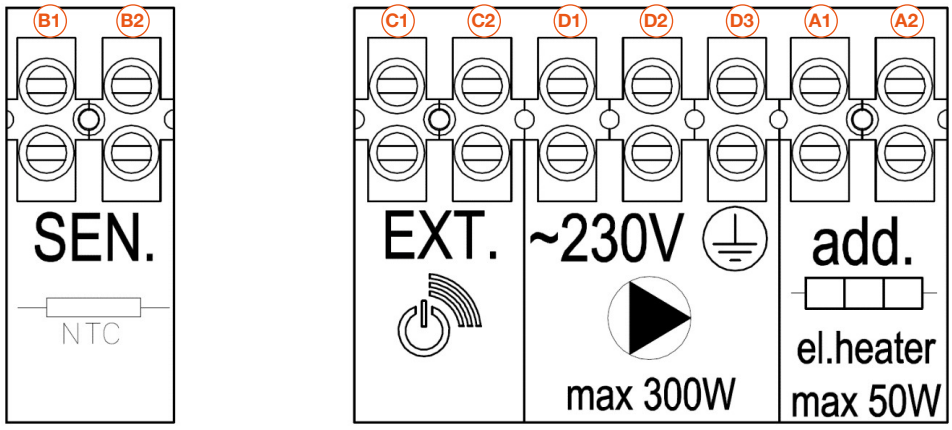
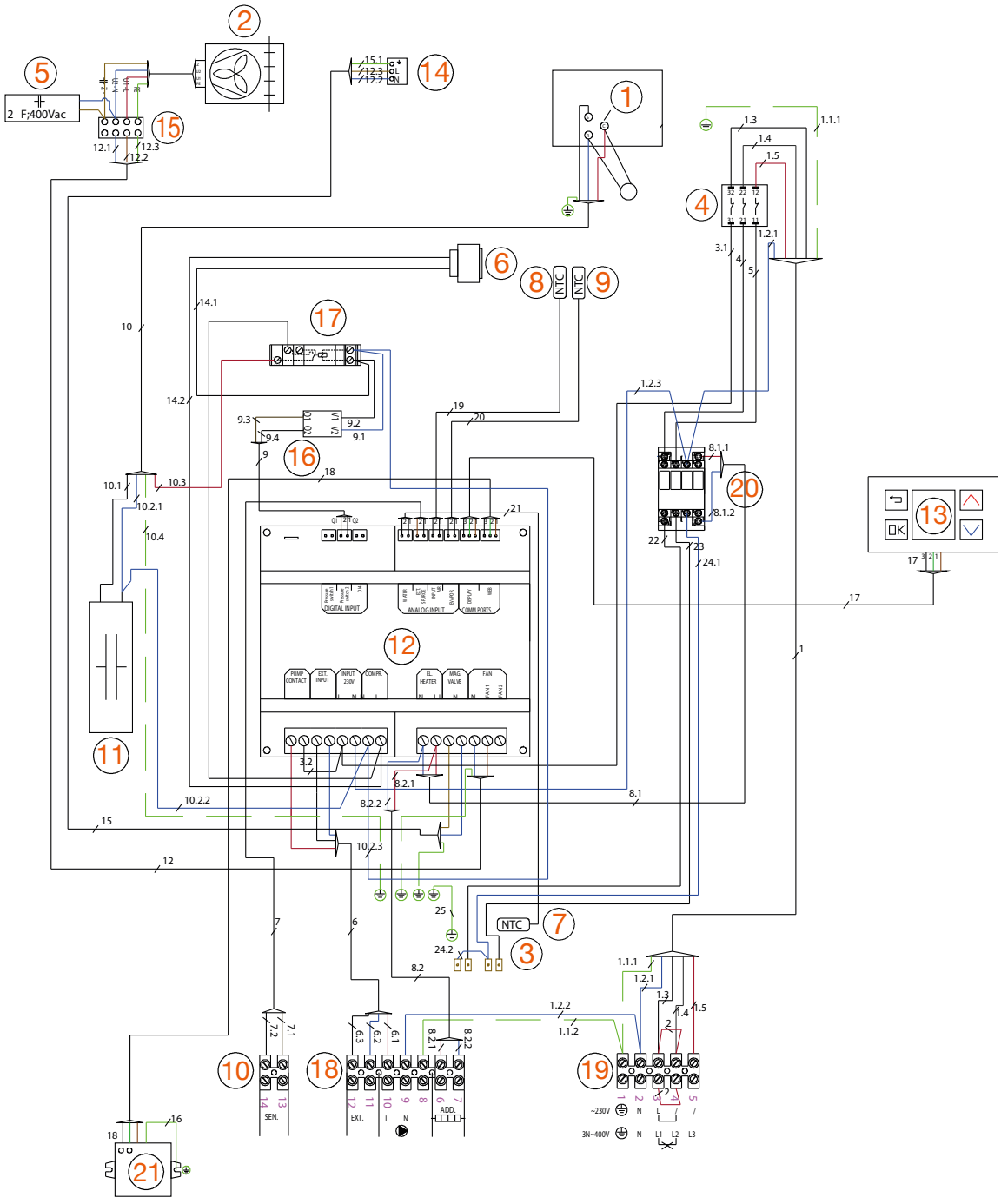


Fig. 18. Additional heat source connection pins

Terminals	Connections	Description
Additional heat sources		
B1 & B2	Temperature probe of the external heat source	Temperature probe of the external heat source must be connected to pins with markings B1 and B2. To measure external heat source temperature (differential thermostat) use temperature probe of the NTC type (10K 1% BETA 3435 1%). Temperature probe power supply is 5 V.
C1 & C2	External signal switch	External signal switch is used to switch on various device functions. Connect external switch on positions C1 and C2.
D1 & D2 & D3	Circulation pump	**Circulation pump** must be connected to the pins under the markings D1, D2 and D3. Connect the steady voltage of ~230 V to D1 and D2 and the neutral lead, and use D3 for the earthing lead. Maximal load of the circulation pump is 300 W.

- **Connection pins of the temperature probe for the external heat source are under 5 V tension.**
- **Bring the tension of ~ 230 V on the pins of the external signal switch and circulation pump.**

Wiring Diagram



1. Compressor - generator
2. Fan
3. Electric heater
4. Safety thermostat
5. Fan capacitor
6. Pressure switch
7. Temperature probe NTC - water
8. Temperature probe NTC - air
9. Temperature probe NTC - evaporator
10. Connection pins of additional source
11. Compressor capacitor
12. Relay panel
13. Display
14. Electromagnetic valves
15. Fan connection pins
16. Optical converter
17. High pressure switch relay
18. Additional heater connection pin
19. Power supply connection pins
20. Contactor
21. Web module

Safety Instructions Before Start-up

- **Check that all connections (electrical, hydraulic) have been carried out and that they are tight and secure.**

- **Before starting the unit, check that the hydraulic circuit(s) is/are full of water and that the unit is supplied with electrical power.**

Filling the Hydraulic Circuit

Conditions: OFF

Procedure:

1. Make sure, that the hot water tank is filled with water and the air is thoroughly removed from it.
2. Make sure, that all of hydraulic connections are tightly sealed.
3. Check that suitable expansion vessel and appropriate safety valve are built in and all safety elements are operational.

Follow-on Task(s):

None

The appliance must never function without water in the hot water tank.

Start-up and Commissioning

Conditions: 

Safety requirements: 

Caution : 

Procedure:

1. Make sure that a heat pump is tightly conected to the plumbing.
2. Make sure, that the hot water tank is filled with water and the air is thoroughly removed from it.
3. Perform the setup of the system as required.

Never switch the unit on and off using the main isolator: this should only be used to disconnect the unit from the power supply when the unit is to be permanently off. Isolation will result in no supply for the crankcase heater and the compressor could be seriously damaged at start-up.

Follow-on Task(s):

None

- *After the device is connected to the electricity supply, the device starts to heat the water in the NORMAL program.*
- *Once the initial start-up process is complete, fill in the installation checklist with all the relevant information on the system for future reference. Refer to* **"Installation Checklist" on page G-63.**

Safety Requirements for Maintenance

- Inspection and maintenance tasks must be carried out by a qualified and certified professional according to the frequency indicated in the maintenance table provided in this manual.
- Once the inspection and maintenance tasks are complete, ensure that all removed components are reinstalled and all connections are tight and secured.
- Always wear appropriate personal protective equipment to perform maintenance or repair tasks.

- Before performing any maintenance operation, shut down the unit and isolate the electrical supply of the appliance through the external power-cutting device (fuse, circuit-breaker, etc.), unless power is required for the procedure (it will then be indicated in the procedure).
- Do not touch the unit with any wet body parts when it is supplied with electrical power.

- The maintenance of the unit and its components must be carried out by a qualified professional.
- Defective parts and components may only be replaced by genuine factory parts or parts approved by the manufacturer.
- The device should be cleaned with non-abrasive damp cloth and mild suds. Use of inappropriate cleaning agents can damage the surface of the device. It is forbidden to use agressive cleaning agents, solvents or cleaning agents which contain chlorine.
- Replace any gaskets or seals present on the removed components before reinstallation, unless otherwise specified in the procedures.
- To ensure the performance, durability and reliability of the unit, it is recommended that the end-user perform the periodic checks.
- If leak detection instruments are installed on the system, they must be inspected at least once a year, to ensure their correct operation.
- If a defect is detected that compromises the reliable operation of the unit, the unit cannot be re-started until it has been repaired.

The inspection and maintenance tasks are detailed in a table in this section. Make sure to perform all the recommended tasks and to fill in the log sheets available at the end of the manual with all the required information.

General Maintenance & Inspection Tasks

Safety requirements: 

Caution : 

The device as a whole, when complying with the instructions for safe use and maintenance, has a set operational time of at least 8 years. Individual components have different operational times, thus, upon potential defects and mechanical damage, they need to be replaced with new ones. Replacements are only allowed with the purchase of technically suitable or original spare parts.

Tasks	Visual inspection	Pressure test	Leaks
Intervention with possible effects on the mechanical strength or after use change or in case the machine has not being working for more than two years. Replace all the components which are not suitable any more. Do not carry out checks at a higher pressure than the one indicated in the project.	X	X	X
Repair, or significant adjustments of the system, or its components. The check may be limited to the interested parts, but if a leakage of refrigerant is detected, a leakage search must be carried out on the entire system.	X	X	X
Inspection after installation in a different position than the original one.	X		X
Leak search, following a well-founded suspicion of refrigerant leakage. It is recommended to examine the system for leakage, either directly (use of leak detection systems) or indirectly (deduction of leakage based on analysis of operating parameters), focusing on the parts most prone to leakage (e.g. connections).	X		X

Specific Maintenance Tasks

Tasks 	Months			Years		AR
	1	2	6	1	5	
Electrical System						
Check that the unit works properly and that there are no active warnings	X					
Visually inspect the unit	X					
Check noise and vibration level of the unit				X		
Check operation of safety features and of interblocks				X		
Check the unit's performance				X		
Check the current draws of the different parts (compressors, fans, pumps, etc.)				X		
Check the supply voltage of the unit			X			
Check tightness of cables in their clamps			X			
Check the integrity of the insulating coating of power cables				X		
Check functioning of the microprocessor and of the display			X			
Clean the electrical and electronic components of any dust				X		
Check functioning and calibration of probes and transducers				X		

Safety requirements: 

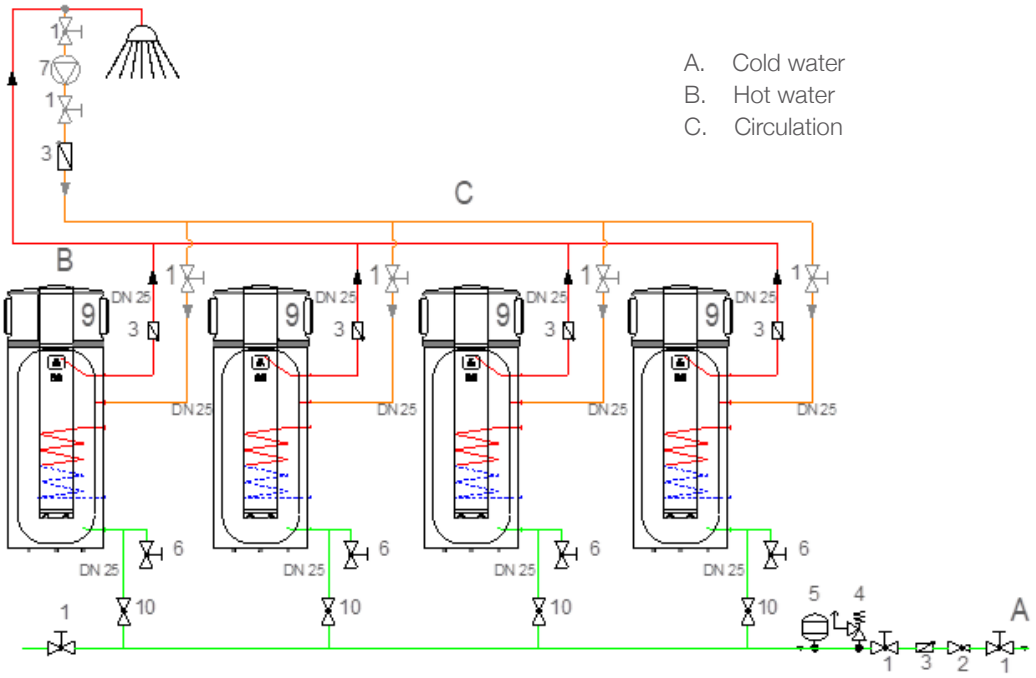
Tasks 	Months			Years		AR
	1	2	6	1	5	
Condensing coils and fans						
Visually inspect the coil	X					
Clean finned coils (1)			X			
Check the water flow and/or any leaks	X					
Clean the metal filter on the water line (3)			X			
Check noise and vibration level of the fans				X		
If not working properly, check the supply voltage of the fans			X			
Check the fans' electrical connections				X		
Check functioning and calibration of the fans' speed adjustment system (if present)				X		
Check 4-way valve operation (if present)				X		
Check air presence in the hydraulic circuit	X					
Check for freon leaks (2)						X

Safety requirements: 

Tasks	Months			Years		AR
	1	2	6	1	5	
Compressors						
Visually inspect compressors				X		
Check noise and vibration level of the compressors				X		
If not working properly, check the supply voltage of the compressors			X			
Check the compressors' electrical connections				X		
Check oil level in the compressors using the oil fill level indicator			X			
Check the conditions of the compressors' power cables and their tightness in the clamps			X			

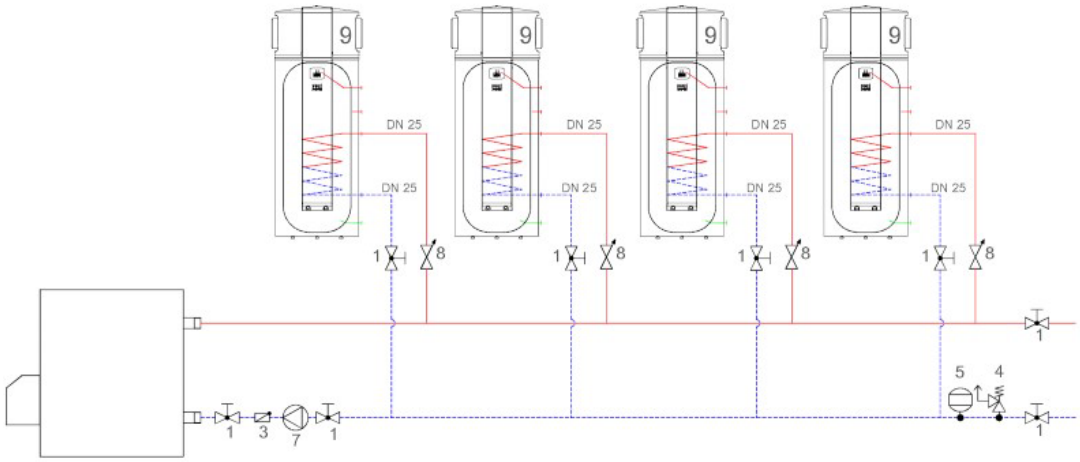
Cascade Connection for Several Devices

Connection of Cold - Hot Water and Circulation



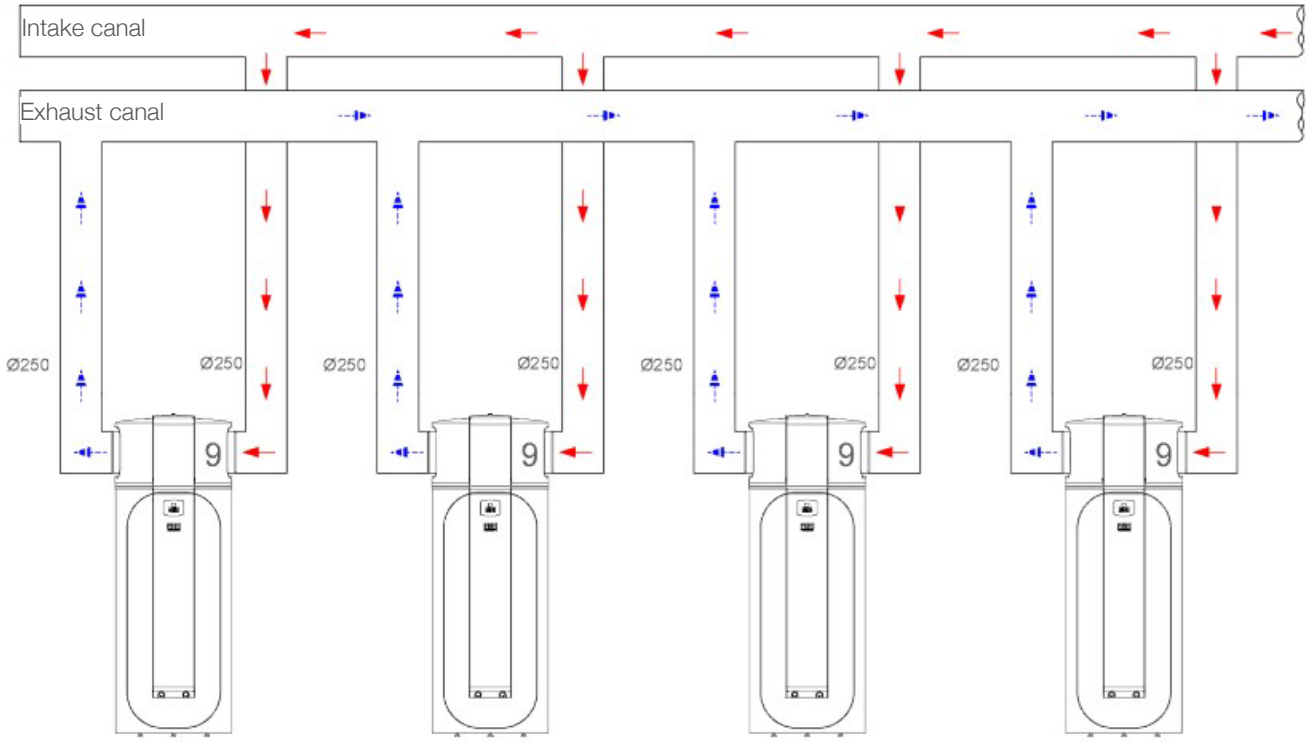
1. Ball valve
2. Reduction valve
3. Check valve
4. Safety valve
5. Expansion vessel
6. Release valve
7. Circulation pump
8. Reduction valve
9. Device

Connection to Boiler



1. Ball valve
2. Reduction valve
3. Check valve
4. Safety valve
5. Expansion vessel
6. Release valve
7. Circulation pump
8. Reduction valve
9. Device
10. Boiler

Air Canal Connection



The table below show internal diameter of pipes (mm) depending on length of canals and number of devices.

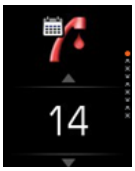
	Number of devices									
Length of canals	1	2	3	4	5	6	7	8	9	10
10 m	150	200	250	250	300	300	350	350	350	350
20 m	200	250	300	300	350	350	400	400	450	450
30 m	200	250	300	350	350	400	400	400	450	450

Largest allowed pressure drop on an individual device is 55 Pa.

Operation of the Control Panel - Engineer Level

- *For the meaning of the icons and functions displayed on the screen, refer to* **"Symbols and Functions on the Control Panel" on page G-12**.
- *Basic operations that can be performed at end user level are described in* **"Operating the Controller - End User Level" on page G-18** .
- *Menu allows access to advanced controller settings by entering a 4-digit security PIN code. Please contact your AIC representative for more information.*

Automatic Overheating Programme - Anti-legionella

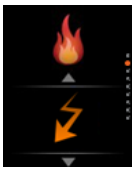


Overheating programme can be set to work on schedule. Factory setting is a repetition of the programme every 14 days. (Settings allow for periods of 1 - 99 days).

If there is no wish to use automatic overheating, the period is set to OFF.

- **The overheating period must obligatorily be set in regards to the national regulation requirement for safe preparation of hot sanitary water.**

Additional source selection



Additional source function allows the activation of one or a combination of heat sources. (Selection depends on heat pump type and presence of other heat sources in the heating system):


internal electric heater


external source

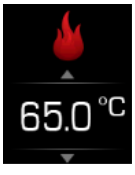

internal electric heater and external source

deactivation of additional source function

For correct operation of the additional source it is necessary to choose a backup source to heat the water. The factory choice is an electric heater built into the device.

In case of using the external heating source, it is necessary to choose the correct icon!

Setting of Temperature of External Source Programme



In the case of external source use, maximal temperature is set, up to which the external source may heat water. The standby temperature in this mode is set to a fixed value of 10 °C.

Factory temperature setting is 60°C.

Setting range: 20 °C – 75 °C.

Setting step: 0,5 °C

External input

The device may be set to change operation programme upon detecting an external input signal.

The external input signal may be triggered by a switch (key) or external device signal (furnace, solar photovoltaic panels, electric counter, etc.).

Several operation programmes are possible:

NORMAL: Switch to programme NORMAL.

ECO: Switch to programme ECO when power tariff is higher to reduce heating costs.

COMFORT: Switch to programme COMFORT when power tariff is lower to increase efficiency of operation.

COMFORT Plus: Switch to programme COMFORT Plus, when power from solar panels is available.

OFF: Remote switch to programme OFF during longer absence from home (device is not in use for a prolonged time).

Quick water heating: Remote programme activation.

PHOTOVOLTAICS: Solar photovoltaic system.

Backup source: Activation of backup source programme.

Function input 1.

Function input 2.

Function input 3.

Standby setup

When water reaches desired temperature, the heating switches off and enters standby mode until water temperature doesn't drop for the standby level difference.

Factory setting for standby difference 7 °C.

Setting area: AUTO or 2 °C – 10 °C.

Setting step: 0,1 °C..

Example: Water heating will deactivate after reaching the desired temperature 55 °C. Heating will reactivate once temperature drops for the standby difference 7 °C, thus to 48 °C.

Dynamic Standby:

In case of setting the standby temperature to AUTO, the standby temperature changes in regards to the set desired water temperature. If the temperature set is 40 °C, standby temperature difference is 5 °C, while in the case of water temperature 55 °C and more, standby equals 10°C. Between temperatures 40 °C and 55 °C the standby temperature difference is calculated in a linear way between 5 and 10 °C.

Static Standby:

Other standby settings are static and are the same for all water temperatures. The minimal temperature difference is thus 2 °C, and the maximal 10 °C. Factory standby difference is set to 7 °C.

Temperature Settings for PHOTOVOLTAICS Programme

Device in the programme PHOTOVOLTAICS - PV (solar photovoltaic system) heats sanitary water to PV temperature setting.

The factory setting is 70 °C.

Setting range: 55 °C – 75 °C.

Setting step: 0,5 °C.

Standby in PHOTOVOLTAICS Programme

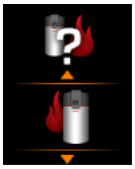
When the temperature of sanitary water in the programme PV drops under the set desired temperature for the programme PV for the temperature deviation value (»Standby in PHOTOVOLTAICS Programme«), the device resumes heating the sanitary water.

Factory temperature deviation setting is 3 °C

Setting range: 1 °C – 20 °C.

Setting step: 0,1 °C

Setting of External Source Use Priority



The setting defines the operation of device generator and external source regime.

priority external source

priority device generator

In case of choosing an external heating source as additional source, it is necessary to determine how the external source will operate!

The operation of the external source with external source priority is used in cases when the external source is available only occasionally. These kinds of heating methods are solar collectors, wood furnaces, fireplaces. This operation mode's regulation for heating DHW will use the device's generator in its basic operation mode; if the temperature of the external source is high enough, the device's generator will turn off and heating with external source will be activated. The water will be heated up to the set temperature of the backup source.

When the water temperature in the device's buffer tank approaches the external source's temperature (the difference in temperature must be 10 °C), the heating with external source turns off, heating continues with the device's generator.

With this mode of heating using the external source, the use of a temperature sensor in the external device is obligatory; if the temperature sensor is not connected, the regulation displays error E02.

In case the basic programme *Additional source* is chosen, heating the water will only be performed in case the external source will have enough heat and not otherwise.

Warnings and errors

Code	Name	Description	Solution
W01	Entry Air Temperature Too Low	If the entry air temperature drops under minimal air temperature (-7°C), the generator of the device is shuts down. Water is heated by the additional heat source, if one is selected. Blockage of the heat pump unit is eliminated when the air temperature is 3 °C above the minimum air temperature (above -4 °C) for 30 minutes. The warning is shown while the activation block is triggered.	To remove the error, the area where the device is installed must be ventilated, so that warmer air may enter the device. Should warmer air not be available, it is recommended to manually activate the backup source, or additional source, if one is selected.
W02	Entry Air Temperature Too High	If the entry air temperature is above the maximal air temperature (35 °C), compressor shuts down. Water is heated by the additional heat source, if one is selected. Blockage of the heat pump unit is eliminated when the air temperature is 3 °C under the maximal air temperature (above under 32 °C) for 30 minutes. The warning is shown while the activation block is triggered.	To remove the error, the area where the device is installed must be ventilated, so that cooler air may enter the device. Should cooler air not be available, it is recommended to manually activate the backup source, or additional source, if one is selected.
W03	High Pressure	In the case of pressure in the cooling system of the generator being too high, the controller shuts down the device operation. After 5 minutes, the device is reactivated. If, after reactivation, the pressure is still too high, the device shuts down once again and displays the warning. Should the warning appear 3 times within 1 hour, the display shows error E05, the device shuts down and Anti-Freeze program becomes active. See description of error E05.	To remove error, first check if there is enough water in the hopper. If the warning is still displayed with enough water present, please contact your AIC representative.
W04	Evaporator Temperature Too Low	If the temperature probe on the evaporator detects that the temperature is too low (-15 °C), the controller switches off the compressor and reports WARNING W04. Water is heated by the additional heat source, if one is selected (chapter 7.3.15.2). Blockage of the heat pump unit is eliminated when the evaporator temperature is 3 °C above the minimum evaporator temperature for 30 minutes.	To remove error, check fan speed or ensure higher entering air temperature.

Code	Name	Description	Solution
W05	Evaporator Temperature Too High	If the temperature probe on the evaporator detects that the temperature is too high, the controller switches off the device and reports WARNING W05. The device is blocked for 30 minutes, the additional source if one is selected becomes active.	To remove the error, the area where the device is installed must be ventilated, so that cooler air may enter the device. Should error not be removed, service has to be called, and manual activation of the backup source, or additional source, if one is selected.
W07	External Source Temperature Too High	If external source temperature exceeds maximal permitted temperature (105 °C), the use of external source ceases. For the reactivation of external source use, the temperature must drop for 5°C. Device operates according to the set programme without using the external source. If manual alternative operation is active, sanitary water heating is interrupted until external source is once again available.	
E01	Water Temperature Probe Error	If there is a water temperature probe error, the device shuts down, and the additional chosen source or internal electric heater are also inactive. Only ventilation operates in the case that it is set to.	To remove the error, please contact your AIC representative.
E02	External Source Temperature Probe Error	If there is an error on the external source temperature probe, the device continues to operate, but operation with external source is deactivated.	If the installation was carried out properly, probe operation has to be checked and, if required, service called. Use of external source is not possible until error is removed.
E03	Entering Air Temperature Probe Error	If there is an error on the entry air temperature probe, the device continues to operate (using the evaporator temperature).If the error is displayed and device is not operational due to the air temperature being too low, it is recommended to manually activate the backup source, or additional source, if one is selected.	To remove the error, please contact your AIC representative.
E04	Evaporator Temperature Probe Error	Should there be an error on the evaporator temperature probe, the device continues to operate, but only to a minimal air temperature difference of 10 °C. Should the error be displayed and device not be operational due to the air temperature being too low, it is recommended to manually activate the backup source, or additional source, if one is selected. If, along with Error E04, Error E03 also appears, the device shuts down and Anti-Freeze program becomes active.	To remove the error, please contact your AIC representative.

Code	Name	Description	Solution
E05	High Pressure Error	If within 1 hour pressure in the cooling system of the generator is detected as too high (WARNING W03), the device shuts down and Anti-Freeze program becomes active. To remove the error, check if there is sufficient water in the water tank of the device. If the error continues to be displayed in spite sufficient water, service has to be called. Heating until the arrival of the service requires a manual activation of the backup source, or additional source, if one is selected.	To remove the error, please contact your AIC representative.
E07	External Source Temperature Difference Error	In the case that the system is connected to an external source which the device may activate via electric signal (oil / gas / pellet / wood furnace, external electric heater), the controller checks the temperature of the external source after activation. If the temperature of the external source is not 5°C higher than the temperature of water in the sanitary water tank after three attempts of activation, the controller reports Error E07 and the circulation pump of the external source is deactivated. External source operation needs to be checked. If the external source is functioning flawlessly, service needs to be called. It is not possible to use the external source until the error is removed.	To remove the error, please contact your AIC representative.
E09	Controller supply voltage error	In the case E09 error is displayed on your device, the low-voltage device components (device generator, electric heater, fan ...) cease to operate. The electronics displays error E09 which means a fault in controller supply voltage. The error will be resolved after establishing normal operation voltage and the device will start operating.	

Errors of the OPTITRONIC 2 - WEB module (optional)

Code	Name	Solution
E81	Error on the connection between WEB module and device controller	To remove error, the cable connecting WEB module and the device (see “Instructions for Error Removal”) must be checked. The connection cable needs to be unplugged from the module, checked, and plugged back in. If the cable is damaged or if the error persists after reconnection, call service. Connection to the service Water Cloud is impossible or limited until error removal.
E82	General internal error of the WEB module	
E83	Memory medium error on the WEB module	
E84	Error on the communication interface of the WEB module	To remove the error, the WEB module has to be unplugged from power and re-plugged (see “Instructions for Connection of Device Into Cloud”). If the error persists after module restart, call service. Connection to the service Water Cloud is impossible or limited until error removal.

Before calling an authorised service, please make sure that:

- *the power supply of the device is carried out directly from the main electrical cabinet*
- *the power supply cable from the main electrical cabinet is only connected to this device*
- *the power supply cable is undamaged*
- *the flow of air through the device is uninhibited (dirt, grille, etc.)*
- *the temperature of entry air is higher than the minimal temperature of air where the device generator is still operational*

Installation Checklist

	Unit	Values/Comments
General/heating system		
Type of building/system		
Commercial purpose (Y/N) ?		
Year of manufacture		
Output of system	kW	
Heated surface	m^2	
Number of heating circuits:		
• Floor heating		
• Radiators		
• Other		
Cascade (Y/N)? Number of appliances?		
Water		
Water hardness at start up	mol/m^3 or mg/l	
System volume	L	
Additive(s)/Antifreeze (Y/N)?		
• Type		
• Quantity	%	
Gas		
Type?		
Heating value	kWh/m^3	
Gas pressure regulator installed (Y/N)? Type ?		
Hydraulics		
Heating circuit normal pressure	bar	
Air purged from the system (Y/N)?		
Safety valve installed (Y/N)? rating?	bar or kW	
Expansion tank(s) installed (Y/N)? Type(s) ?		
• Size?	L	
• Precharged pressure ?	bar	
• Number		

	Unit	Values/Comments
Plate heat exchanger in the system (Y/N)? Type?		
Low loss header in system (Y/N)? Type ?		
Number of mixers ?		
Buffer tank (Y/N)? Size?	L	
DHW tank (Y/N)? Type?	L	
Pump(s) (Y/N)? Type?		
• In which circuit(s)		
• Chosen according to requirements for the appliance?		
Flue gas		
Open or closed system?		
Dimensions of combustion air openings if closed system	cm^2	
Material of flue piping		
Diameter and length of piping system	mm / m	
Chimney system engineered by?		
Calculated pressure drop, including maximum wind condition (<200 Pa)?	Pa	
Cascade (Y/N)?		
Back-flow preventer or non-return valve installed (Y/N)? Type?		
Condensates		
Condensate discharge slope	° or cm/m	
Condensate trap filled (Y/N)?		
Neutralisation system installed (Y/N)? Type ?		
Condensate pump installed (Y/N)?		
Condensate pump control line connected (Y/N)?		

	Unit	Values/Comments
Controller		
Appliance controller?		
Other controller (Y/N)? Type?		
Optional modules installed (Y/N)		
• Type?		
Optional items installed (Y/N)?		
• Outdoor sensor (Y/N)? Type?		
• Room unit(s) (Y/N)? Type?		
• Others?		
Miscellaneous		
The end user has received all relevant information (Y/N)?		
The end user has received all relevant documents (Y/N)?		

Name

Date

Signature

NOTES

NOTES

NOTES

AIC Europe B.V.
Graafschap Hornelaan 163A
NL-6001 AC Weert
The Netherlands

www.myaic.eu