

installation and maintenance manual

for the installer and the user

AURAX Mini Ni

10 to 40 kW

HIGH EFFICIENCY REVERSIBLE AIR TO WATER HEAT PUMP

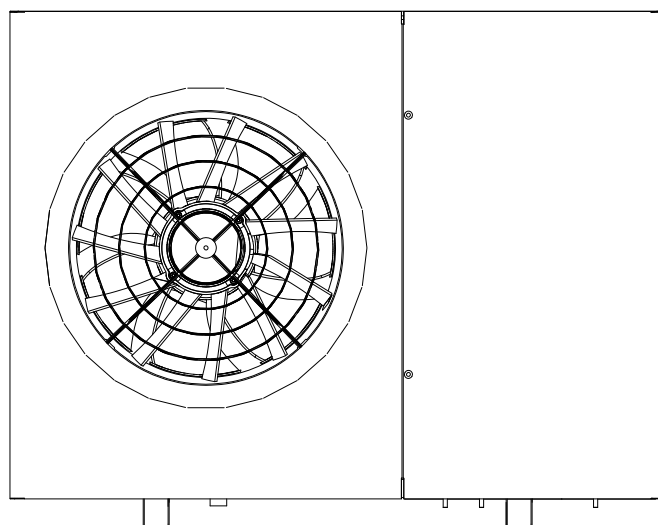


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The prefixes used in the page numbering indicate the following:

G- : General information

U- : Pages intended for the end user

I- : Pages intended exclusively for the qualified professional (e.g. installer)

About our heat pumps:

Compliance

Our heat pumps are compliant with the following directives and regulations:

- **ErP Energy Related Products Directive 2009/125/EC**
- **LVD Low Voltage Directive 2014/35/EU**
- **EMC Electromagnetic Compatibility Directive 2014/30/EU**
- **PED Pressure Equipment Directive 2014/68**
- **ROHS Restriction of Hazardous Substances Directive 2011/65/EU**

GENERAL INFORMATION

Liabilities of the Manufacturer, the Installer and the End user

Manufacturer

Our products are manufactured in compliance with the requirements of the applicable European and United Kingdom 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 of 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, 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, 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 web-site (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.



Sharp elements - risk of injury or cut.



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



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.



The refrigerant circuit must be full/empty of refrigerant.



The water circuit must be full of water/empty.



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

Safety instructions



THIS UNIT CONTAINS REFRIGERANT R290 WHICH IS HIGHLY FLAMMABLE SUBSTANCE

- ▶ Use care to handle such substances - make sure to wear protective personal equipment.
- ▶ Ensure correct ventilation to avoid refrigerant vapour concentrations close to the ground.
- ▶ Avoid contact with open flames or hot surfaces, which could cause an explosion.
- ▶ In case of leak or spillage, contain with sand or other suitable absorbent material. Do not allow the refrigerant to flow into drains, sewers or basement, where vapour could form.
- ▶ Follow the safety instructions and emergency procedures contained in this manual.
- ▶ In case of absolute necessity, perform an emergency stop as instructed in this manual.



- ▶ This product is intended exclusively for heating, cooling and domestic hot water production.
- ▶ 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 equipment (respiratory protection, gloves, safety glasses, etc.) to carry out cleaning and maintenance tasks.
- ▶ 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

- An Aurax Mini Ni Heat pump,
- An Installation and Maintenance manual
- 4 Rubber bell antivibration dampers
- A flow switch*
- A hose connector for condensate drain
- 2 nylon gaskets (for flow switch connection)
- 2 NTC temperature probes -50/110 °C rubberized bulb D5X20 1.5 MT BLACK: one AC buffer tank probe and one DHW tank probe
- A set of documentation, containing electrical data and declaration of conformity.

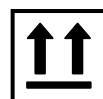
Refer to **“Unpacking the Product”** on page I-35 for the complete unpacking and installation instructions.

* Refer to **“Installing a flow switch”** on page I-55

Unit marking

The data plate is located on the back of the heat pump.

Symbols on the Packaging



This side up



Keep dry



Fragile



Do not stack

				Manufacturer: Frost Italy S.r.l. Via Lago di Trasimeno n.46 36015 Schio -VI-Italy			
N° SERIE SERIAL NUMBER / NUMÉRO DE SÉRIE							
ANNO YEAR / ANNÉE		MODEL: Aurax Mini Ni 10					
POTENZA FRIGORIFERA (COOLING CAPACITY/PUISSANCE FRIGORIFIQUE)		7,99	[kW]	GWP (AR5)	3		
POTENZA TERMICA (HEATING CAPACITY/PUISSANCE THERMIQUE)		9,69	[kW]	REFR. CLASS	A3		
POTENZA ELETTRICA MASSIMA (MAX ABSORBED POWER/PUISSANCE ABSORBÉE MAX)		7,16	[kW]	PED GROUP	1		
CORRENTE ELETTRICA MASSIMA (MAX OPERATING CURRENT/INTENSITÉ MAX DE FONCT.)		13,85	[A]	PED CAT.	II		
CORRENTE DI SPUNTO (STARTUP CURRENT/COURANT DE DÉMARRAGE)		13,85	[A]	PS_HP [bar]	34,7		
CARICA DI REFRIGERANTE (REFRIGERANT CHARGE/CHARGE DE RÉFRIGÉRANT)		1,8	[kg]	PS_LP [bar]	18,2		
tCO₂ (tCO ₂ /tCO ₂)		0,0054	[t]	TS_HP [°C]	-10/120		
PESO (WEIGHT/POIDS)		182	[kg]	TS_LP [°C]	-35/25		
TIPO DI ALIMENTAZIONE (POWER SUPPLY TYPE/TYPE D'ALIMENTATION EL.)		1+N+PE 230/50 V/Hz/~		REFRIGERANT	R290		
CONTIENE GAS FLUORURATI AD EFFETTO SERRA DISCIPLINATI DAL PROTOCOLLO DI KYOTO CONTAINS FLUORINATED GREENHOUSE GASES GOVERNED BY THE KYOTO PROTOCOL - CONTIENT DES GAZ À EFFET DE SERRE FLUORÉS RÉGÉS PAR LE PROTOCOLE DE KYOTO							

GENERAL INFORMATION

Emergency stop

The emergency stop allows the unit to be stopped in the shortest possible time.

If the need arises to activate this procedure, proceed as follows:

- ▶ Using a wrench, size 10 remove the screws (1) around the access door.
- ▶ Turn the main switch (2) (yellow and red) to the OFF position; this immediately stops the unit by deactivating the power supply to the unit.
- ▶ Call your installer to troubleshoot the system and restart the unit.

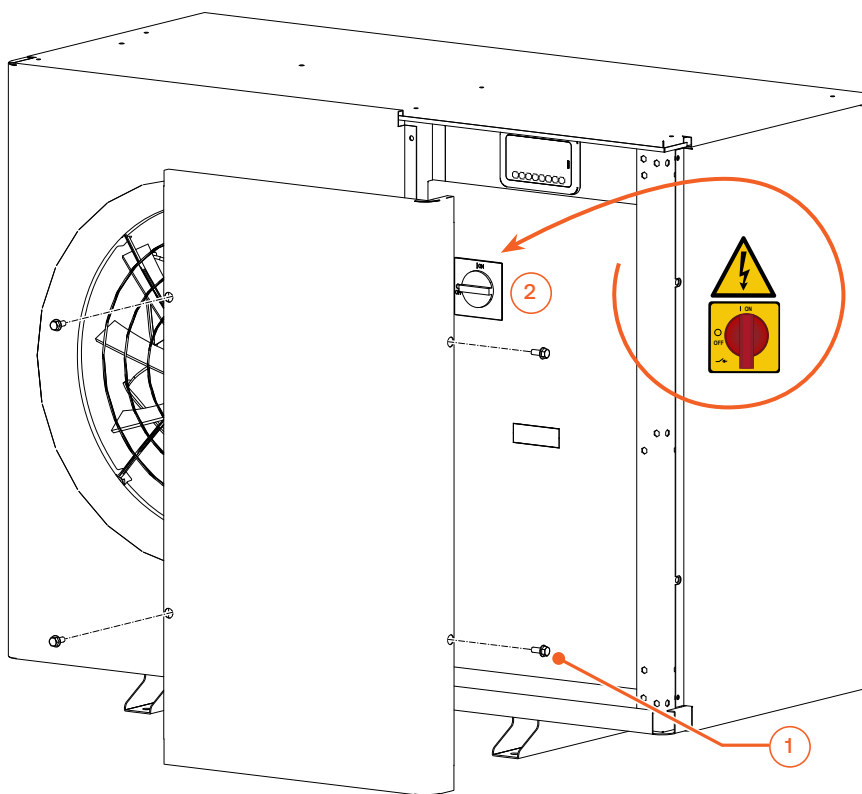
Restarting after an emergency stop



- ▶ **This procedure can only be performed by qualified personnel.**
- ▶ **Before restarting and providing power supply to the unit, make sure that the reason/problem that initiated the emergency stop is found/corrected.**

To reset the unit after an emergency stop, proceed as follows :

- ▶ Turn the main switch (2) to the ON position; this action does not restart the unit but restores power supply to the unit.
- ▶ Perform the start up procedure of the unit, refer to “**Start-up and Commissioning**” on page I-57.



**The main switch is located behind the front door of the unit. Depending on the model, its position may slightly differ from the illustrated configuration.*

Fig. 1. Location of the main switch

Health and Safety - Hazard and Prevention

Danger	Location	Potential Injuries	Prevention	First Aid
 	Heat exchanger fins	- Cuts - Hand injuries - Incised wounds		- Clean the wounds with disinfectant - Dress the wounds - In case of severe injuries, seek medical assistance
  	Fan and fan grids	- Cuts - Hand/eye injuries - Broken bones - Incised wounds	  Do not put objects through the protection grids	
 	Compressors Discharge pipes	- Burns (contact with hot surface) - Frostbites (contact with refrigerant)	   Check the pressure	In case of inhalation: - Move the person away from the source of exposure, keep them warm and let them rest - Administer oxygen if necessary - Attempt artificial respiration if breathing has stopped or shows signs of stopping - If the heart stops, perform external heart massage - Seek medical assistance In case of contact with the skin: - Wash immediately with lukewarm water - Thaw tissue using water - Remove contaminated clothing. Clothing may stick to the skin in case of frostbite - If irritation, swelling or blisters appear, seek medical assistance In case of contact with the eyes: - Rinse immediately using an eyewash or clean water, keeping eyelids open, for at least ten minutes - Seek medical assistance In case of ingestion - Do not induce vomiting - If the injured person is conscious, rinse their mouth with water and make them drink 200-300 ml of water - Seek immediate medical assistance Do not administer adrenaline or similar sympathomimetic drugs following exposure, due to the risk of cardiac arrhythmia
	Low pressure safety valve (refrigerant circuit)	Poisoning (contact with skin or eyes, inhalation or ingestion)		
	High pressure safety valve (refrigerant circuit)	- Burns (heat/contact with refrigerant or hydraulic oil) - Poisoning (contact with skin or eyes, inhalation or ingestion) - Loss of hearing	    Check the pressure	

GENERAL INFORMATION

Safety Instructions

<i>Danger</i>	<i>Location</i>	<i>Potential Injuries</i>	<i>Prevention</i>	<i>First Aid</i>
	‣ Electric cables and metallic parts ‣ Unit enclosure	‣ Electric shock ‣ Burns (contact with hot metal/fire)	 ‣ Make sure the system has adequate electrical protection ‣ Check adequate insulation of all power cables ‣ Make sure all metallic parts are earthed	‣ For severe burns or electric shocks, seek immediate medical help
	‣ Entire unit	‣ Burns due to fire ‣ Poisoning (inhalation of fumes)	‣ Make sure the heat pump isn't installed near the flammable gas.	In case of burns: ‣ In case of light burns, pour cold water on the wounds and dress the wounds. ‣ In case of severe burns, seek medical assistance In case of inhalation: ‣ Move the person away from the source of exposure, keep them warm and let them rest ‣ Administer oxygen if necessary ‣ Attempt artificial respiration if breathing has stopped or shows signs of stopping ‣ If the heart stops, perform external heart massage ‣ Seek medical assistance

Aurax Mini Ni

General Description

The AURAX Mini Natural is a high-efficiency reversible air-to-water heat pump with independent production of Domestic Hot Water (DHW).

The unit can provide DHW all the year round in each operative mode, both in a single cycle (DHW mode activated) and in a combined cycle (chiller or heat pump mode activated). It means that availability of Domestic Hot Water is always ensured.

This unit uses the R290 refrigerant, which, in combination with BLDC rotary compressor controlled by inverter, with a wide operating range, makes the pump ecological and highly efficient.

The 2-pipe model is equipped with two hydraulic connections, and through the activation of an external 3-way valve allows for production of domestic hot water and conditioning water (hot water for heating in the winter period and chilled water for cooling in the summer period). It is designed to operate efficiently in heating mode even at outdoor temperatures of -15 °C, producing hot water up to 70°C.

The 4-pipe heat pump option is equipped with 2 additional connections dedicated for domestic hot water system without the need for a 3-way valve.

The air-refrigerant heat exchanger is made of copper tubes and aluminium fins, which design guarantees low air-side pressure drop, meaning low rotation speed, and less noise of the fan. The fans are equipped with a safety guard and direct drive axial type and are fixed to the frame by antivibration rubber mounts

Refrigeration circuit

The refrigeration circuit is made of cooper and complies with the Pressure Equipment Directive 2014/68/EU (PED) and the standard EN 13134 concerning brazing procedures. The refrigerant gas used is R290.

The circuit includes: filter dryer, high and low pressure switches and pressure transducers, liquid and humidity indicator, service connections, solenoid valve for the production of DHW(4-pipe version), safety valve, electronic expansion valve, four way reversing valve.

Controller

All standard units are supplied with a controller.

The controller measures system parameters such as water temperature, refrigerant pressure and temperature, compressor discharge temperatures.

It provides compressor timing and alarm reset and protection against freezing.

The control panel is equipped with a display with user interface and a RS485 communication device with Modbus RTU protocol, which allows connection to the BMS remote control system.

The controller is set to handle automatic defrosting (when operating under severe outdoor conditions) and summer/winter switching and has also the ability to manage the anti-legionella function – setting the thermal shock program and co-transfer of DHW by activating specific functions.

Control and Protection Devices

All units are supplied with the following control and protection devices:

- utility water return temperature probe,
- high pressure switch with automatic reset,
- low pressure switch with automatic reset,
- compressor thermal protection,
- fan thermal protection,
- pressure transducer,
- paddle water flow switch and safety valves on the refrigerant circuit.

PRODUCT DESCRIPTION

Accessories

Pump kit for heating/cooling

Hydraulic kit includes a circulating water pump for heating or cooling. It is suitable for hydraulic circuits with standard pressure drop according to accessory data sheet. In addition, the hydraulic kit is supplied with protective circuit breaker and control contactor (controlled directly by the Heat Pump controller). For proper operation it is recommended to maintain the velocity of water/glycol under 2 m/s and limit the pressure drop of the system below limit given in the accessory data sheet.

Pump kit for 4-pipe system

Hydraulic kit: Domestic hot water pump (DHW water pump) and for heating in 4-pipe HP should be installed in the system (outside HP). Suitable for hydraulic circuits with standard pressure drop according to accessory data sheet. Complete kit with protective circuit breaker and control contactor (controlled directly by the Heat Pump controller). For proper operation it is recommended to maintain the velocity of water under 2 m/s and limit the pressure drop of the system below limit given in the accessory data sheet.

Hydraulic kit

Hydraulic kit is installed outside the unit structure and permits to limit space and an easier installation of the system. It is composed by: Y filter, safety valve with gas separator, antifreeze valve.

Remote display

Remote display is used for operating and controlling the unit remotely: power on/off, set point selection, summer/winter mode, reading pressures, operating temperatures and alarms. The display allows remote connection up to 50 m.

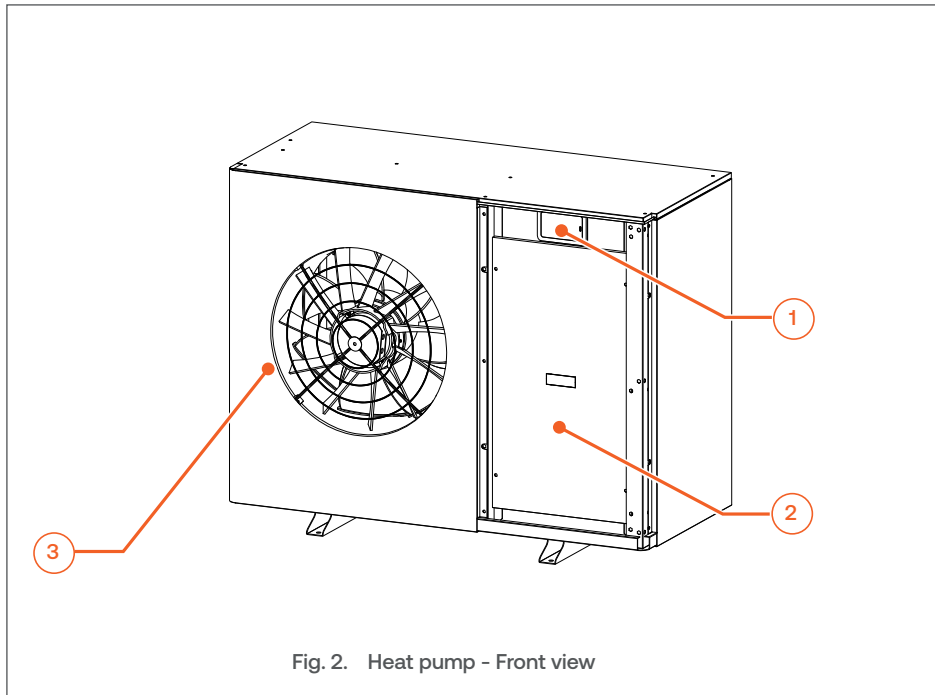
Cascade controller

There are two models of cascade controllers. They manage, depend on model, up to 4 or 6 units. Active functions: on/off, rotation, alarms and circulation water pump.

Gas Separator

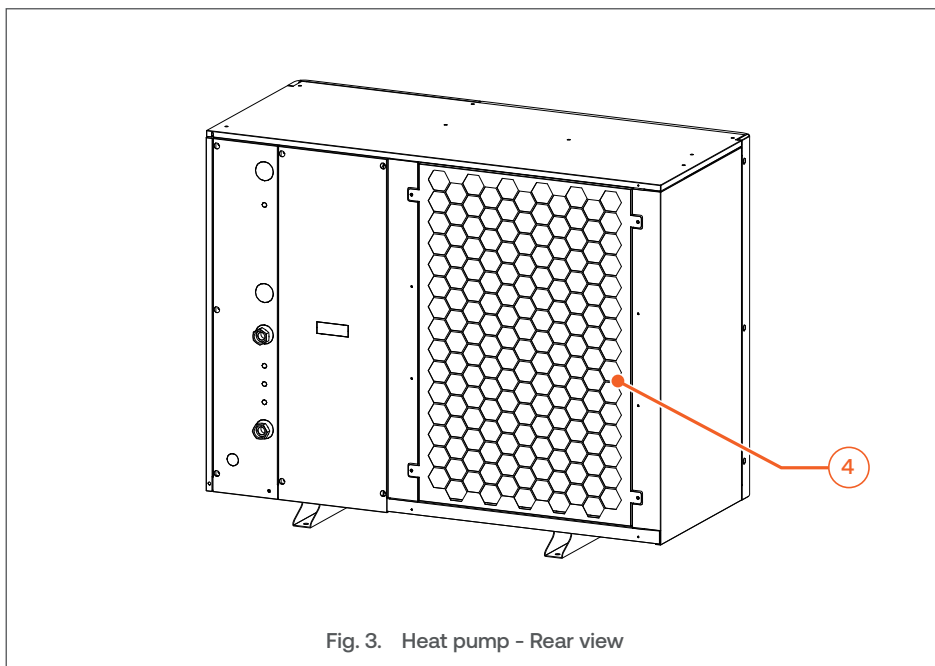
The composite gas separator is used to continuously remove gasses from the hydraulic circuits. It allows to separate air and cooling gasses, collecting them in the upper tank. A special stainless steel filter inside the separator body gives a cyclone effect that allows the speed to be reduced, releasing micro-bubbles that create a bigger bubble, which is released through the air release valve.

Heat pump main components



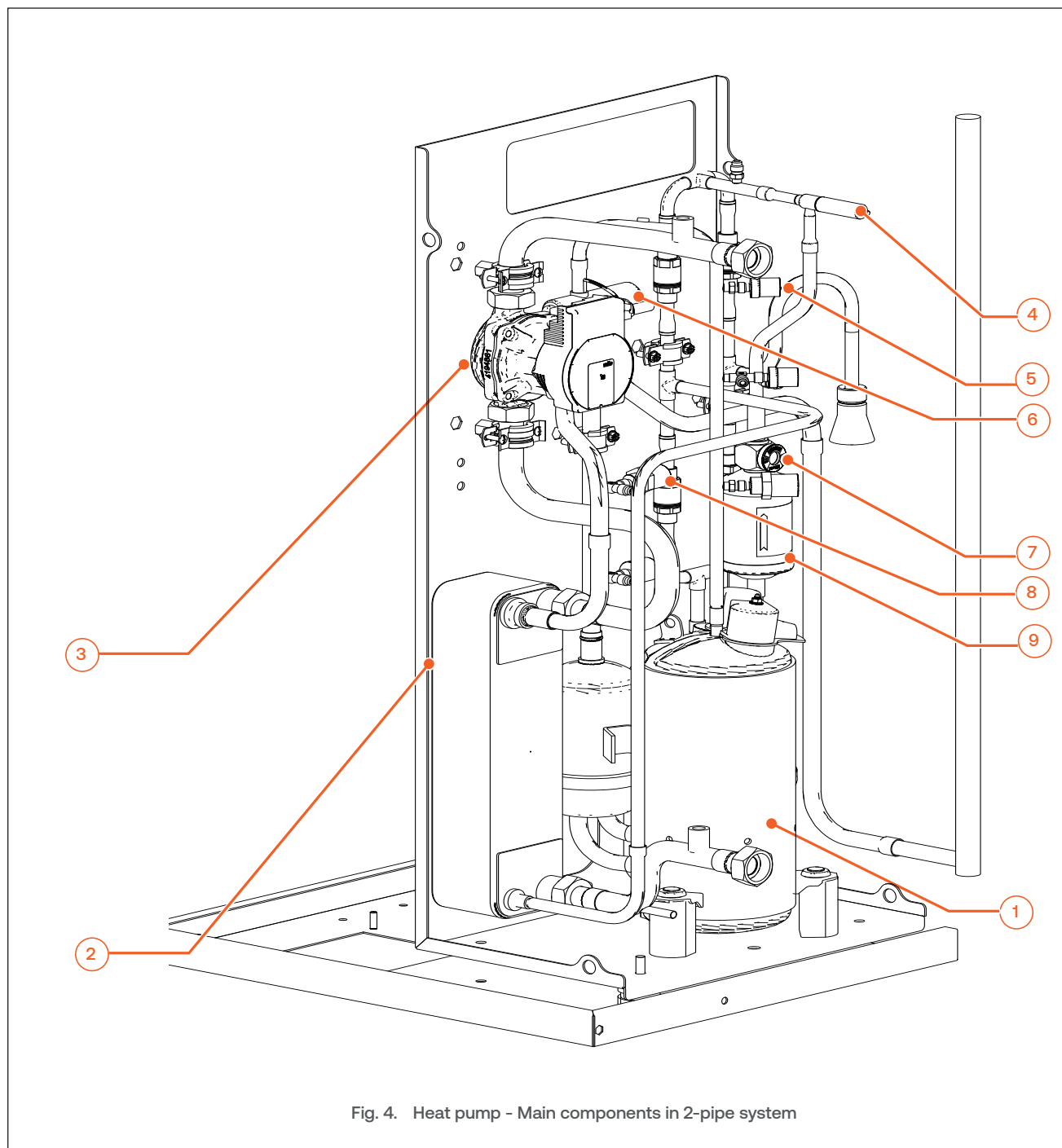
KEY:

- 1. Controller
- 2. Electrical board
- 3. Fan
- 4. Finned heat exchanger



PRODUCT DESCRIPTION

Heat pump hydraulic components



• The position and/or aspect of the components inside the heat pump can slightly differ according to the model. This drawing shows Aurax Mini Ni 10 kW.

KEY:

- | | |
|-------------------------------|-----------------------------------|
| 1. Compressor | 6. 4-way valve |
| 2. Plate heat exchanger | 7. Sight glass moisture indicator |
| 3. Water pump | 8. Low pressure transducer |
| 4. Electronic expansion valve | 9. Filter dryers |
| 5. High pressure transducer | |

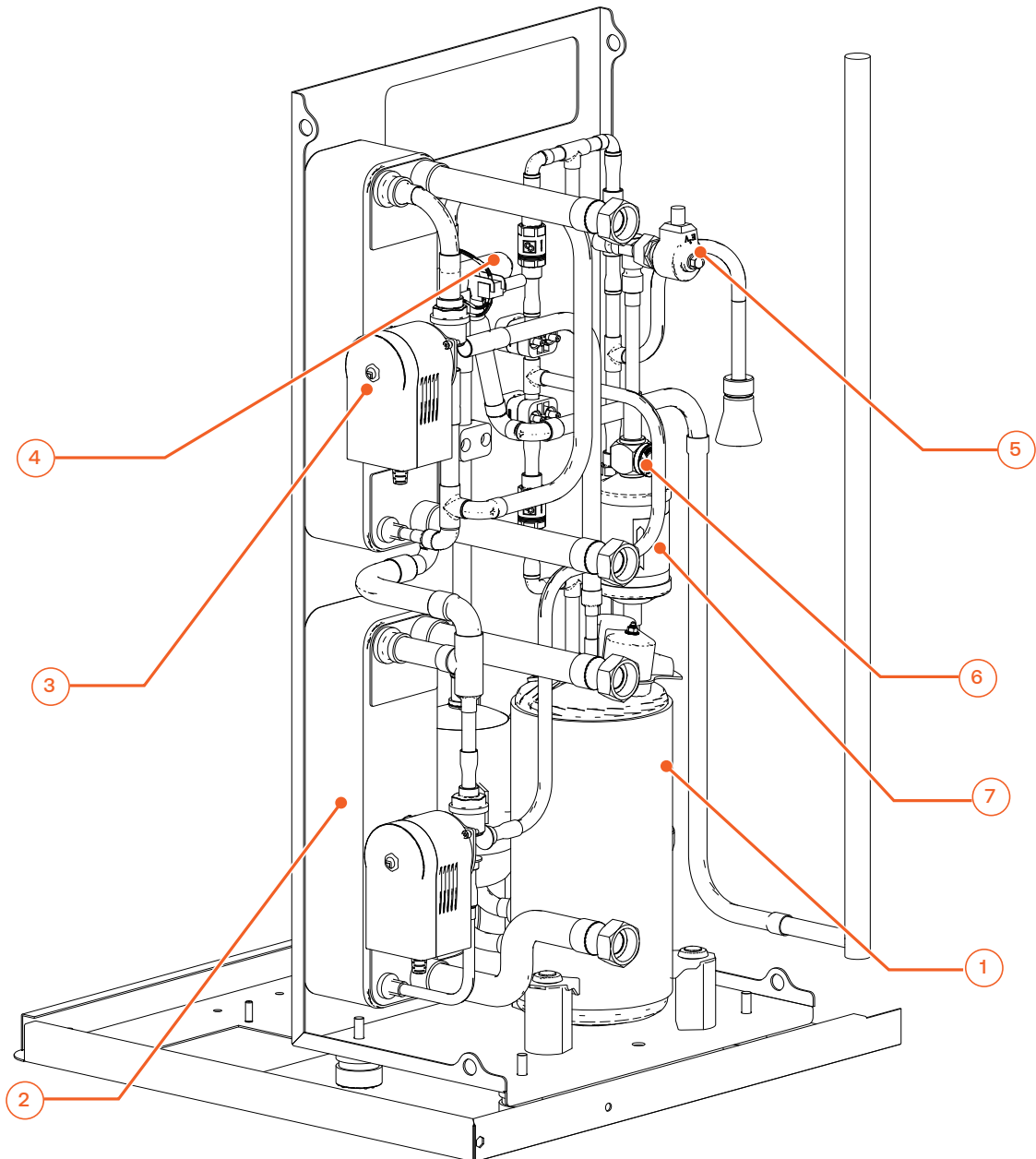


Fig. 5. Heat pump - Main components in 4-pipe system

• The position and/or aspect of the components inside the heat pump can slightly differ according to the model. This drawing shows Aurax Mini Ni 10 kW.

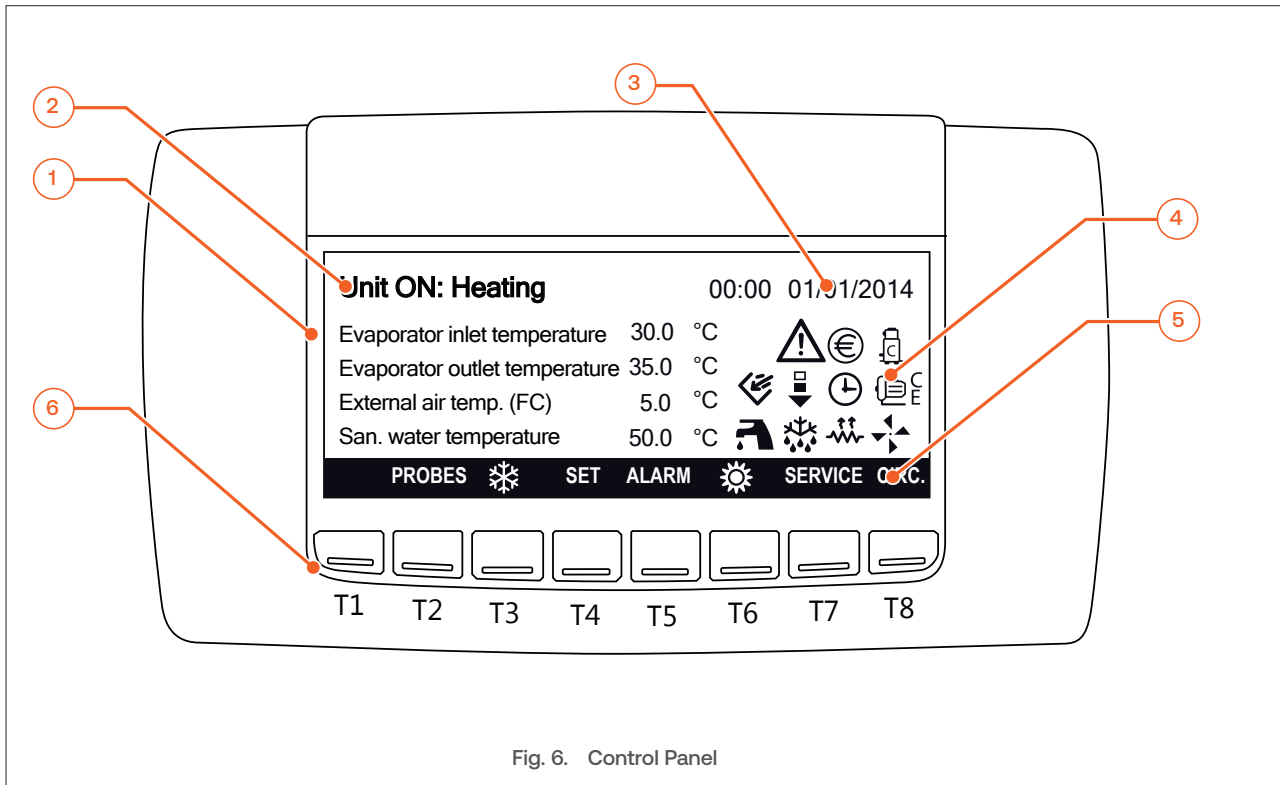
KEY:

1. Compressor
2. Plate heat exchanger
3. 3 way valve
4. 4-way valve
5. Electronic expansion valve

6. Sight glass with moisture
7. Filter dryer

PRODUCT DESCRIPTION

Control Panel and Main Functions



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-16.
- 2. Operation status** - Indicates the current operating condition: On or Off, Heating or Cooling, etc.
- 3. Clock** - indicates the current date and time.
- 4. Symbol area** - Zone of the screen where the system icons are displayed, indicating that a function or circuit is activated.
- 5. Horizontal menu bar** - Indicates the available functions that can be activated through the keys underneath. Depending on the activated function, the contents of the menu bar change.
- 6. T1 to T8 function keys** - to activate the functions displayed in the menu bar above.

The screen parameters such as brightness and contrast, language, etc. can be adjusted through the Service function and the  icon.

See the opposite page and **"Screen and Language Setup"** on page U-39.

Symbols and Functions on the Control Panel

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

-  **Compressor.** Indicates that the compressors are in operation.
-  **Water pump.** Indicates that the pump is in operation.
-  **Fans.** Indicates that the fans are in operation.
-  **Domestic Hot Water.** Indicates that the Domestic Hot Water mode is activated.
-  **Alarm.** Indicates that an alarm is active and requires attention.
-  **Economy mode.** Indicates that the unit is operating in economy mode.
-  **Unloading.** Indicates that the unloading function is activated.
-  **Electric Heater.** Indicates that the electric heater is activated.
-  **Timer.** Indicates that the Economy mode or unit is ON/OFF according to the setting of the timer.
-  **Defrost.** Indicates that the defrosting function is active.

Icons and functions appearing in the **menu bar** - they are activated by pressing the key located under each of them:

-  **Power function** - To turn the unit off
-  **Cooling** - To enable the unit in cooling function.
-  **Heating** - To enable the unit in heating function.
- PROBES** Activate this function to read the value of the installed and configured sensors.
- SET** Activate this function to modify a parameter.
- ALARM** Activate this function to read and reset the alarms.
- SERVICE** Activate this function to access the service menu. See also the service-related icons opposite.
- CIRC** Activate this function to get the information on the circuits (compressors, water pump, sensors, etc.)
- ENTER** Activate this key to validate a value or selection.
- EXIT** Activate this key to go back to the main menu.
- RESET** Activate this key to reset an alarm that is not active.
- RST ALL** Activate this key to reset all the alarms that

are not active.

ENB/DIS To enable/disable functions (only for Service personnel).

 &  These keys allow to move up and down the list of menu items/ increase or decrease a value.

 &  These keys allow to scroll through the screens.

Service symbols appearing on the **Display**:

-  **Service menu** (Service only). To access the service menu and set the parameters.
-  **Time and date.** To carry out time and date setting and read time band settings.
-  **Compressors.** To display the status of the compressors (working hours, number of activation).
-  **Pumps.** To display the status of the water pumps (working hours).
-  **Circuits.** To display the status of the circuits.
-  **Alarms.** To access the current alarms
-  **Alarm log.** To access the list of alarms (up to `99 are stored).
-  **Defrost** (if available). To read the status of defrost for each circuit.
-  **Electrical Heater.** To read the status of the electrical heaters.
-  **Input/output.** To read the probe status, analog/ digital input and output.
-  **Screw compressor** (if available). To display the discharge temperature and liquid injection setpoint.
-  **Auxiliary output.** To read information about auxiliary output.
-  **Domestic Hot Water.** To read information about the DHW circuit control.
-  **Upload/Download** (service only)
-  **Control panel setup.** To access contrast and backlight, language selection, system information, etc.

* *Some functions visible on the control panel may not be available, as they depend on the heat pump model.*

PRODUCT DESCRIPTION

Location of the unit



- ▶ It is recommended to install the outdoor unit in a free-standing position on a fixed substructure with a height of at least 350 mm.
- ▶ The unit must be installed in an open space with the required airflow and in a way that prevents the recirculation of outside air. The airflow direction is shown on Fig. 7.

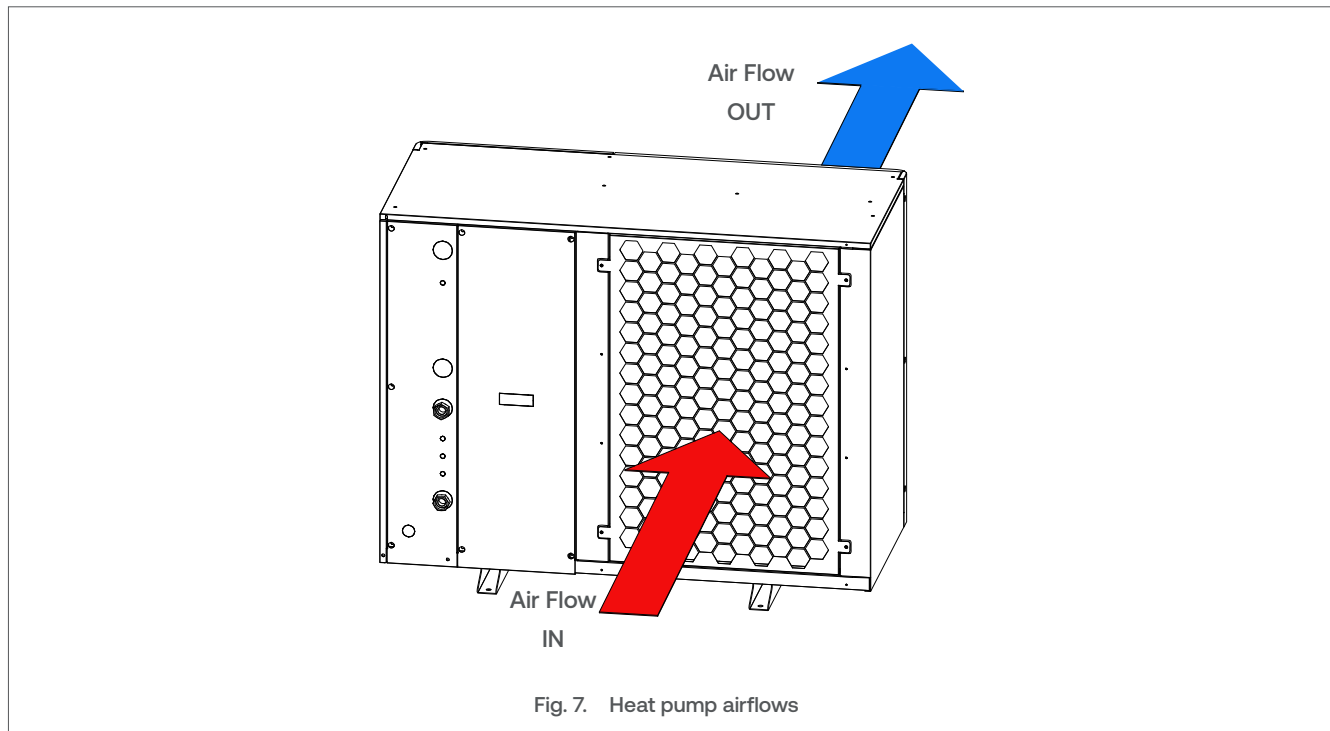


Fig. 7. Heat pump airflows

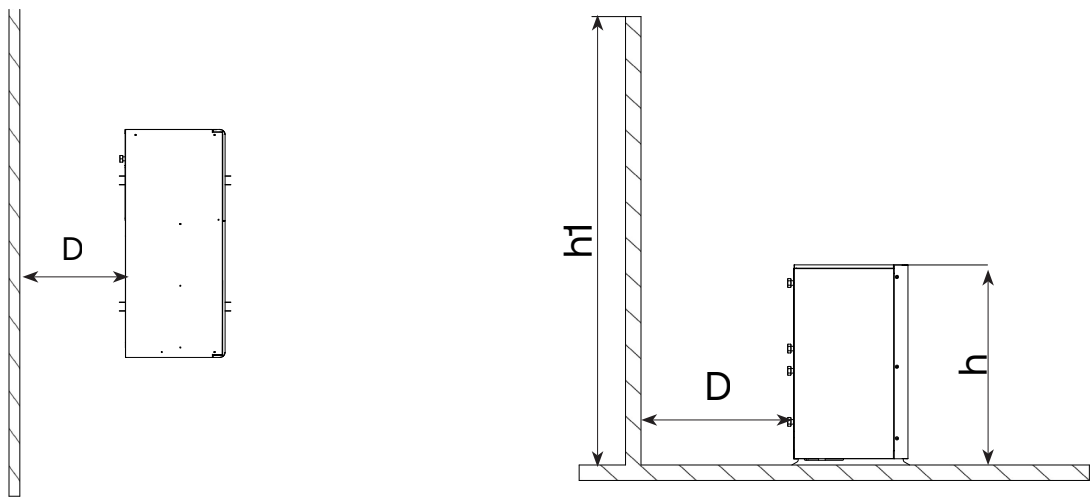


- ▶ For systems using flammable refrigerants, there shall be no refrigerant leaks that will flow or stagnate. The failure to comply with this requirement may result in a fire or explosion hazard in areas within the unit containing components and apparatus which may be a source of ignition.
- ▶ The use of tools that generate sparks must be strictly avoided within the safety area.
- ▶ The unit **MUST** be installed in a safe location, exclusively outdoor, in area free of obstacles for ventilation and maintenance and free from any sources of open flames. Access must be provided for ordinary and extraordinary maintenance of the unit.
- ▶ The installation area must therefore be delimited and with access reserved for authorized persons only.
- ▶ Maintain a safety area around the unit as shown in the figures on page G-19, G-20. In case of stricter national regulations, follow those regulations.



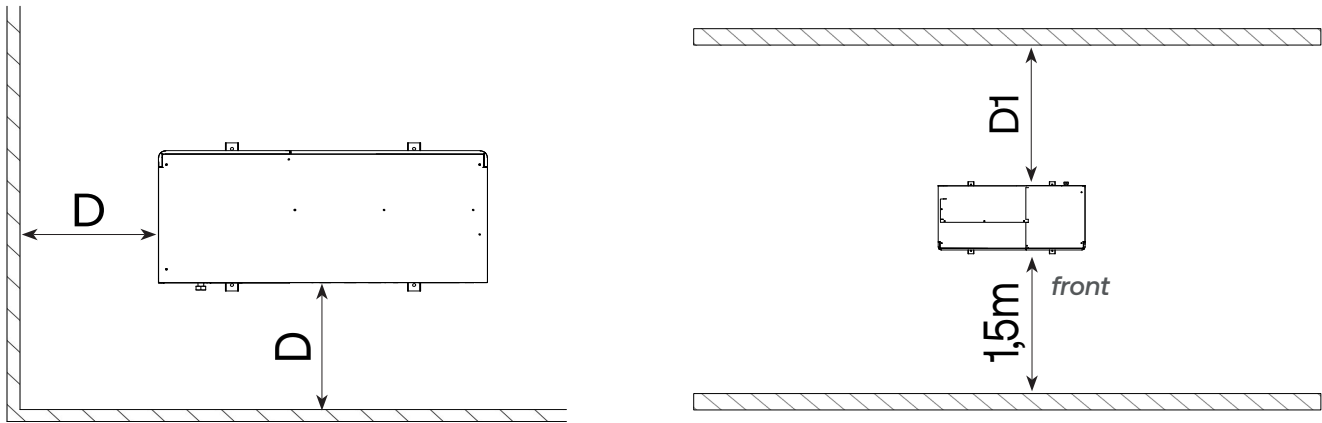
- ▶ In the defined safety area around the product, there must be no manholes, basement entrances, windows or doors communicating with areas below the unit installation level where open flames are present or where there is no mechanical or natural ventilation.
- ▶ The units, in their standard configuration, are not suitable for installation in saline environment.
- ▶ The installation of units below lower ground level is only permitted if a refrigerant sensor and automatic ventilation system are installed. If the elevation profile of the ground level is oblique to respect to the floor of the installation, and is partly lower than the floor, the installation is allowed if there are no obstacles towards the lower ground level.

Wall layout - 1 wall



Quantity of heat pumps	D			
	$h_1-h \leq 0$ [m]	$0 \leq h_1-h \leq 1$ [m]	$1 \leq h_1-h \leq 3$ [m]	$3 \leq h_1-h$ [m]
1	0,3	0,3	0,3	0,3
2	0,3	0,3	0,3	0,3
3	0,3	0,3	0,3	0,35
4	0,3	0,3	0,35	0,4
5≥	0,3	0,35	0,4	0,45

Wall layout - 2 walls

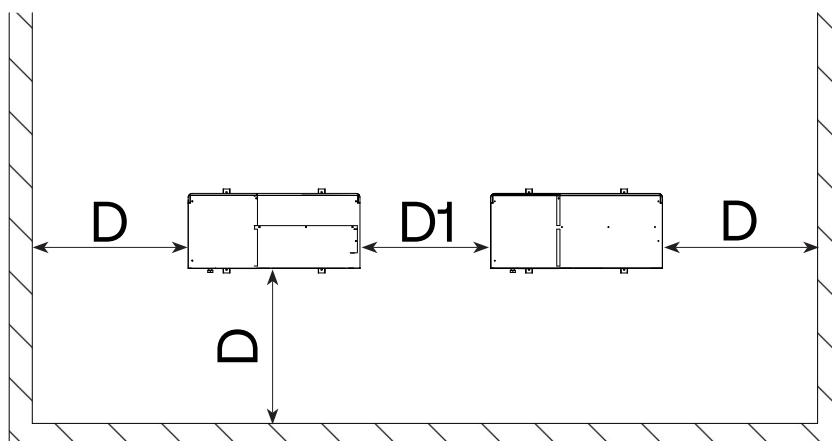


PRODUCT DESCRIPTION

Quantity of heat pumps	D1* [m]	$h_i - h \leq 0$ [m]	$0 \leq h_i - h \leq 1$ [m]	$1 \leq h_i - h \leq 3$ [m]	$3 \leq h_i - h$ [m]
		D [m]			
1	0,3	0,3	0,3	0,3	0,3
2	0,3	0,3	0,3	0,35	0,35
3	0,3	0,35	0,35	0,35	0,4
4	0,3	0,35	0,35	0,4	0,45
5 $\geq$	0,3	0,4	0,4	0,45	0,5

* Minimum distance for service

Wall layout - 3 walls

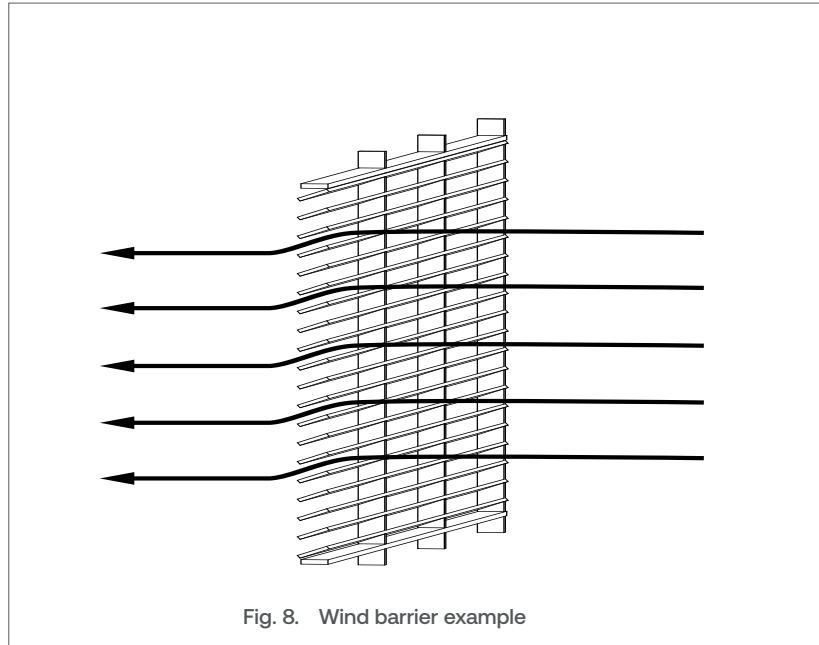


Quantity of heat pumps	D1* [m]	$h_i - h \leq 0$ [m]	$0 \leq h_i - h \leq 1$ [m]	$1 \leq h_i - h \leq 3$ [m]	$3 \leq h_i - h$ [m]
		D [m]			
1	0,3	0,3	0,3	0,3	0,3
2	0,3	0,35	0,35	0,4	0,45
3	0,3	0,35	0,4	0,45	0,5
4	0,3	0,4	0,45	0,5	0,55
5 $\geq$	0,3	0,45	0,5	0,55	0,6

* Minimum distance for service



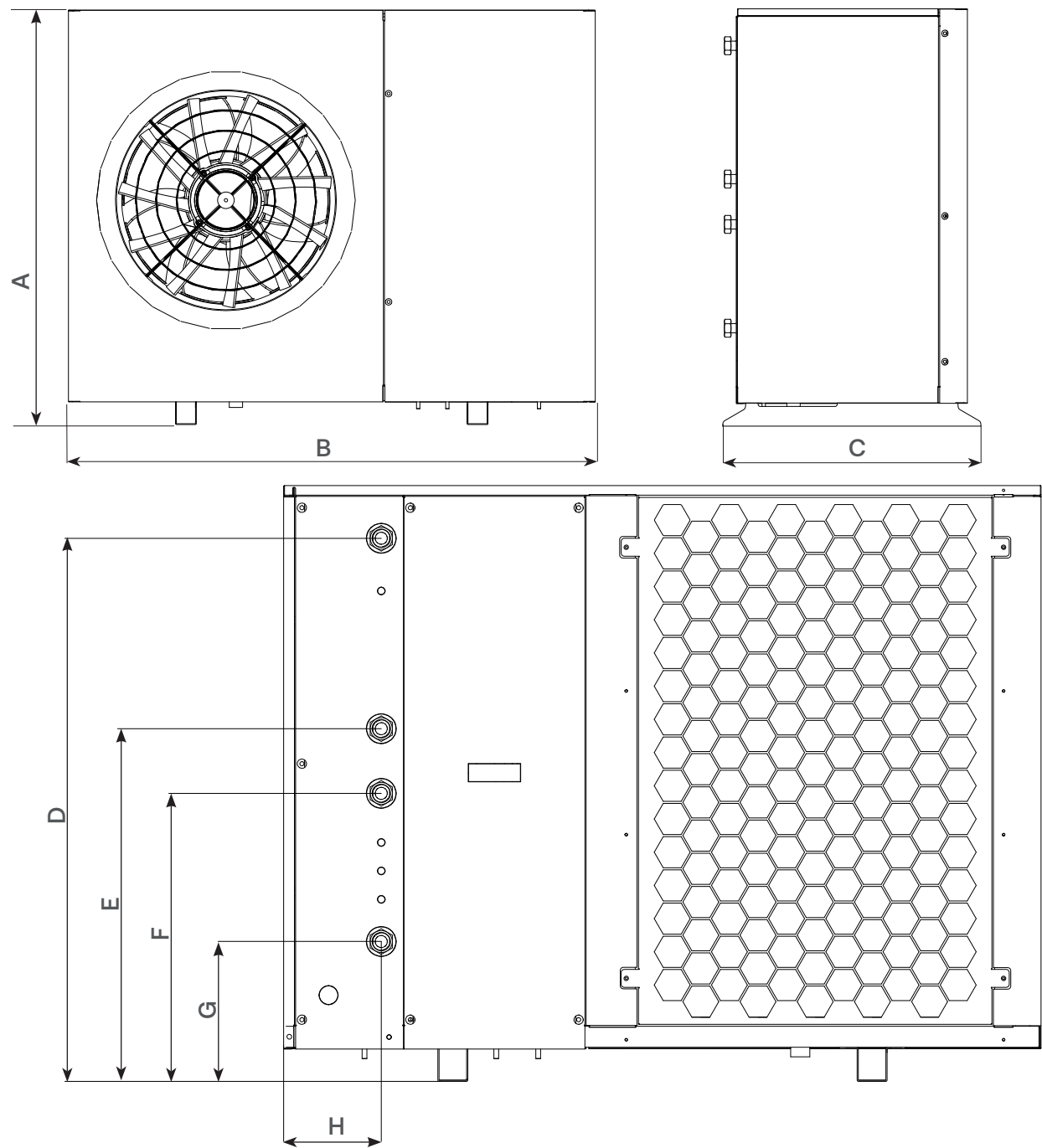
If the unit is installed in windy areas, where the wind speed is greater than 2,5 m/s, it is necessary to use wind barriers or increase the distance between the heat pumps by 0,8 m and the distance between the wall and the heat pump by 0,5 m to prevent malfunctions.



It is recommended to install anti-snow roof to prevent gathering snow on the unit.

TECHNICAL SPECIFICATIONS

Dimensions and weight

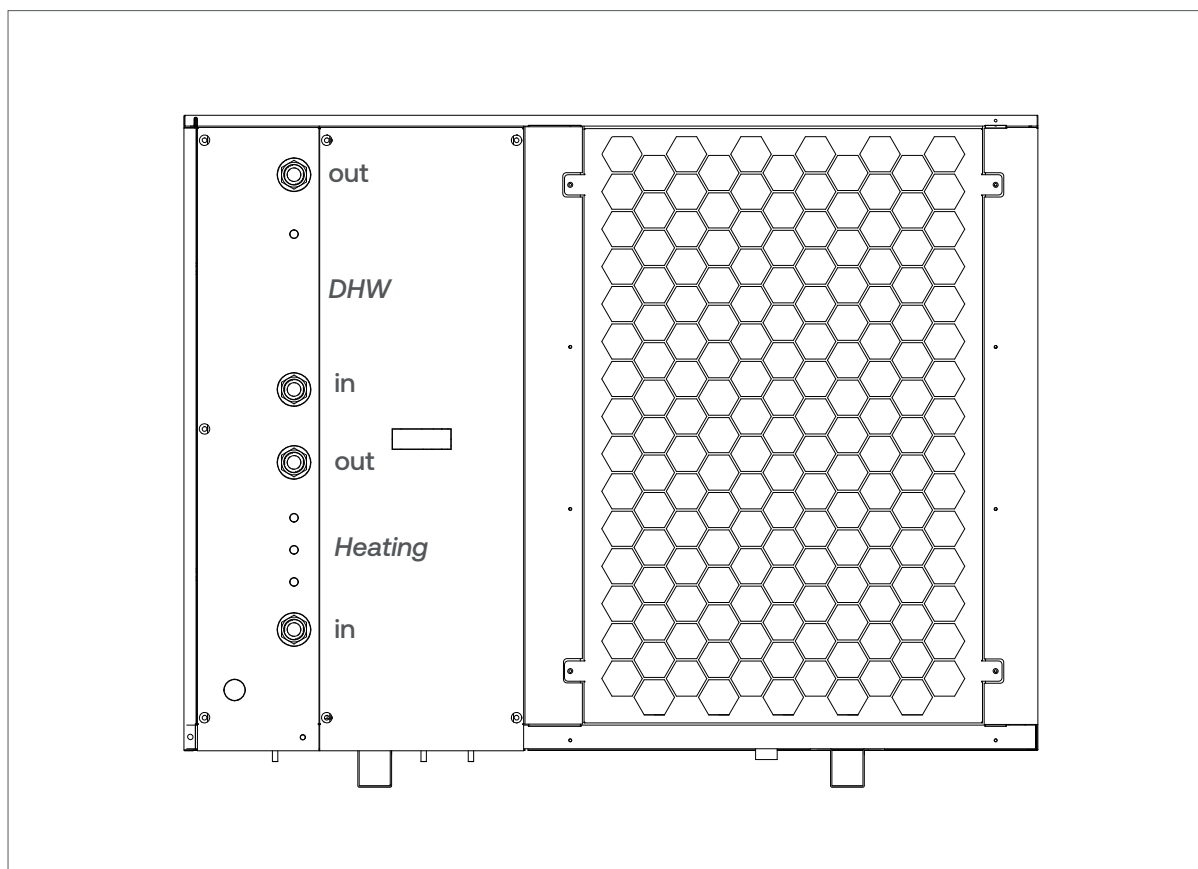


* Model above shows- 4-pipes model

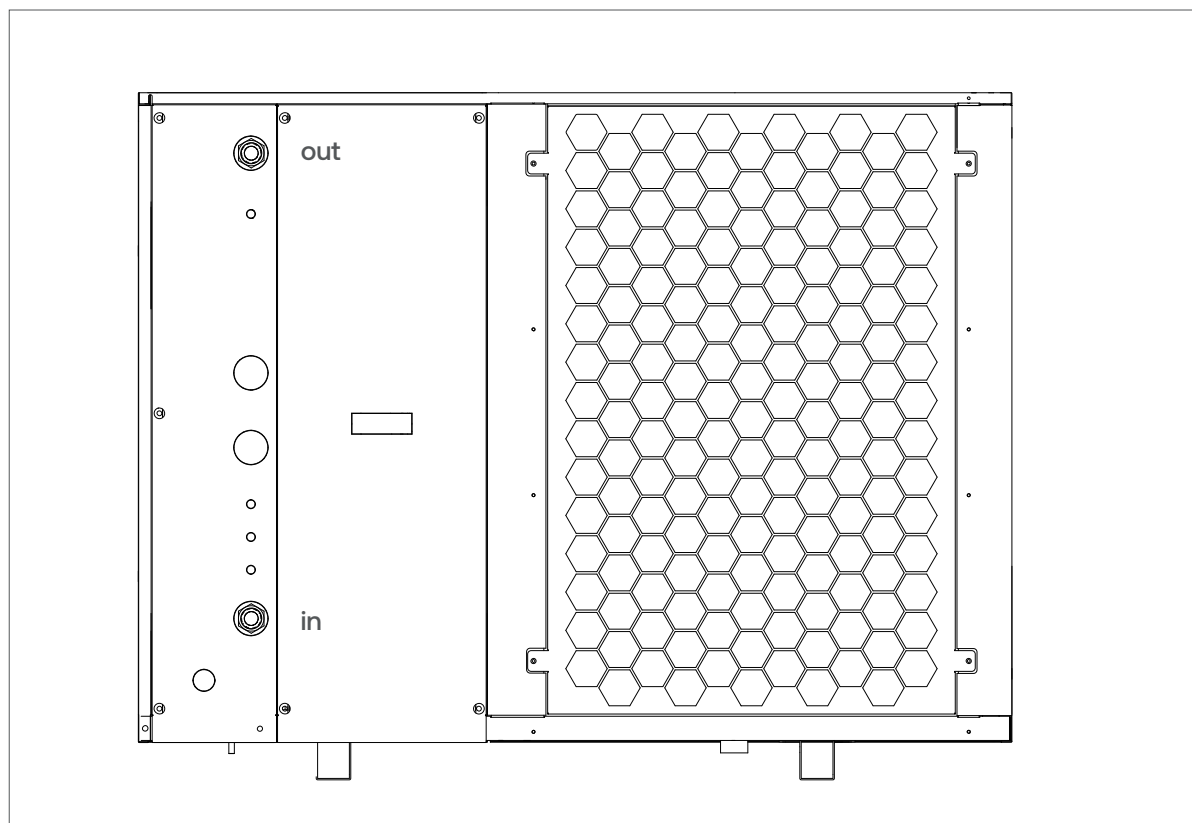
	D		E	F	G	H
	2-Pipes	4-Pipes	4-Pipes	4-Pipes	2-Pipes/ 4-Pipes	
Aurax Mini 10 Ni	-	907	589	481	234	163
Aurax Mini 15 Ni	-	907	589	481	234	163
Aurax Mini 20-25 Ni	1155	1024	706	548	230	150
Aurax Mini 30-35-40 Ni	1180	1014	696	538	220	150

mm

4-Pipe heat pump connections



2-Pipe heat pump connections



TECHNICAL SPECIFICATIONS

AURAX MINI NI 2 AND 4 PIPES

			AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
A	height (without antivibration feet)	mm	995	995	995	1293	1293	1353	1353	1353
B	length	mm	1265	1565	1560	1828	1828	2076	2076	2076
C	width	mm	620	620	620	660	660	712	712	712
	weight (2-pipes)	kg	161	178	181	303	303	370	370	370
	weight (4-pipes)	kg	173	190	190	317	317	387	387	387

Connections

AURAX MINI NI 2 AND 4 PIPES

		AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
flow/return threaded connections [F]	Ø	G 1	G 1	G 1	G 1 1/4	G 1 1/4	G 1 1/2	G 1 1/2	G 1 1/2

AURAX MINI NI 2 AND 4 PIPES

Primary circuit performance data

			AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
heating*(A7/W35)	max. heating capacity	kW	10,13	15,81	15,81	21,15	25,43	30,48	35,07	40,69
	min. heating capacity	kW	5,01	5,14	5,14	9,09	9,22	11,30	11,23	11,35
	nom. heating capacity	kW	7,66	11,7	11,7	15,91	19,32	23,3	25,36	29,11
	nom. power input	kW	1,54	2,68	2,68	3,1	3,91	4,92	5,16	6,47
	COP		4,96	4,37	4,37	5,12	4,95	4,73	4,91	4,5
heating*(A7/W55)	max. heating capacity	kW	9,57	15,03	15,03	19,43	23,34	29,25	33,45	39,17
	min. heating capacity	kW	4,6	4,73	4,73	7,89	8,22	10,28	10,13	10,32
	nom. heating capacity	kW	7,18	11,12	11,12	14,11	17,75	22,18	24,04	27,91
	nom. power input	kW	2,08	3,54	3,54	4,16	5,29	6,97	7,27	9,15
	COP		3,46	3,14	3,14	3,40	3,36	3,18	3,31	3,05
heating*(A2/W35)	max. heating capacity	kW	8,86	14,03	14,03	18,42	22,38	26,78	30,87	36,15
	min. heating capacity	kW	4,34	4,46	4,46	7,88	8,06	9,78	9,73	9,85
	nom. heating capacity	kW	6,66	10,28	10,28	13,79	16,78	20,27	22,08	25,49
	nom. power input	kW	1,51	2,61	2,61	3,07	3,87	4,86	5,08	6,36
	COP		4,41	3,94	3,94	4,49	4,33	4,17	4,34	4,01

* according to EN 14511

Primary circuit performance data

AURAX MINI NI 2 AND 4 PIPES

			AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
heating*(A2/W55)	max. heating capacity	kW	8,35	13,26	13,26	16,84	20,48	25,54	29,25	34,57
	min. heating capacity	kW	4	4,12	4,12	6,72	7,10	8,98	8,83	9,02
	nom. heating capacity	kW	6,24	9,73	9,73	12,05	15,34	19,22	20,84	24,32
	nom. power input	kW	1,99	3,38	3,38	4,04	5,14	6,71	6,99	8,77
	COP		3,13	2,88	2,88	2,98	2,99	2,87	2,98	2,77
heating*(A-7/W35)	max. heating capacity	kW	7,01	11,42	11,42	14,47	17,85	21,39	24,76	29,36
	min. heating capacity	kW	3,37	3,47	3,47	6,03	6,36	7,56	7,48	7,6
	nom. heating capacity	kW	5,22	8,17	8,17	10,22	13,14	15,88	17,33	20,25
	nom. power input	kW	1,43	2,45	2,45	2,99	3,78	4,64	4,86	6,05
	COP		3,64	3,33	3,33	3,42	3,47	3,43	3,56	3,35
heating*(A-7/W55)	max. heating capacity	kW	6,59	10,71	10,71	12,55	16,38	20,12	23,1	27,62
	min. heating capacity	kW	3,14	3,24	3,24	5,07	5,47	6,96	6,8	6,97
	nom. heating capacity	kW	4,9	7,71	7,71	8,94	11,95	14,93	16,19	19,07
	nom. power input	kW	1,84	3,09	3,09	3,81	4,88	6,14	6,41	8,01
	COP		2,66	2,5	2,5	2,35	2,45	2,43	2,52	2,38

* according to EN 14511

AURAX MINI NI 2 AND 4 PIPES

Cooling

			AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
cooling*(A35/W7)	max. cooling capacity	kW	7,88	11,57	11,57	16,35	19,62	22,84	26,47	29,81
	min. cooling capacity	kW	4,14	4,49	4,49	7,48	7,25	9,02	9,02	8,99
	nom. cooling capacity	kW	6,11	9,49	9,49	12,98	14,94	17,88	19,59	21,94
	nom. power input	kW	1,9	3,19	3,19	3,46	4,72	5,58	6,35	8,06
	EER		3,22	2,97	2,97	3,75	3,17	3,21	3,09	2,72
cooling*(A35/W18)	max. cooling capacity	kW	10,76	15,44	15,44	22,8	27,04	31,37	36,13	40,32
	min. cooling capacity	kW	5,6	6,07	6,07	10,47	10,08	12,48	12,48	12,44
	nom. cooling capacity	kW	8,32	12,74	12,74	18,02	20,84	24,91	27,21	30,3
	nom. power input	kW	2,06	3,5	3,5	3,59	4,97	5,9	6,73	8,66
	EER		4,03	3,64	3,64	5,02	4,19	4,23	4,04	3,5

* according to EN 14511

TECHNICAL SPECIFICATIONS

AURAX MINI NI 2 AND 4 PIPES

ErP data

		AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
air to water heat pump	Y/N	Y	Y	Y	Y	Y	Y	Y	Y
low-temperature heat pump	Y/N	N	N	N	N	N	N	N	N
equipped with a supplementary heater	Y/N	N	N	N	N	N	N	N	N
heat pump combination heater	Y/N	N	N	N	N	N	N	N	N
temperature application	°C	35 °C / 55 °C	35 °C / 55 °C	35 °C / 55 °C	35 °C / 55 °C	35 °C / 55 °C	35 °C / 55 °C	35 °C / 55 °C	35 °C / 55 °C
climate conditions		average	average	average	average	average	average	average	average
SCOP* 35 °C		4,90	4,46	4,46	4,58	4,64	4,94	4,51	4,49
annual energy consumption QHE 35 °C	GJ	9,7	17,4	17,4	2,6	26,3	35,0	35,0	47,9
seasonal space heating energy efficiency η_s 35 °C	%	193	175	175	180	183	195	177	177
seasonal space heating energy efficiency class**		A+++	A++	A++	A++	A++	A+++	A++	A++
range of energy efficiency classes		A+++ → D							
SCOP* 55 °C		3,90	3,72	3,72	3,55	3,68	3,93	3,65	3,65
seasonal space heating energy efficiency η_s 55 °C	%	153	146	146	139	144	154	143	143
seasonal space heating energy efficiency class**		A+++	A++	A++	A+++	A++	A++	A++	A++
range of energy efficiency classes		A+++ → D							
SEER (7 °C)		3,91	3,39	3,39	4,12	4,17	3,88	3,98	3,62
Seasonal space cooling efficiency $\eta_{s,c}$ 7°C	%	153	133	133	162	164	152	156	142
sound power level, outdoors LWA (EN 3744)	dB(A)	70	69	69	74	74	74	75	75
sound pressure level LpA @ 10m (EN 12102)	dB(A)	42	41	41	46	46	46	47	47

* according to EN 14511

** Reg. UE 813/2013

DHW circuit
performance data

DHW A35/W55*

AURAX MINI NI 2 AND 4 PIPES

		AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
domestic hot water capacity	kW	15,89	23,82	23,82	35,19	40,34	51,98	56,4	60,83
COP		4,58	3,72	3,72	5,19	4,38	4,75	4,27	3,78

* according to EN 14511

Primary Circuit hydraulic data

AURAX MINI NI 2 AND 4 PIPES

		AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
heating	min water content	l	140	220	220	300	360	450	500
	recommended water tank vol.	l	280	440	440	600	720	900	1000
	pressure drop at $\Delta T = 5k$	kPa	11,09	24,65	24,65	25,29	35,62	23,37	28,19
	max. operating pressure	MPa	1	1	1	1	1	1	1
	min. operating temperature	°C	15	15	15	15	15	15	15
	max. operating temperature	°C	70	70	70	70	70	70	70
	nom. water flow rate at $\Delta T = 5k$	m³/h	1,68	2,61	2,61	3,52	4,25	5,32	5,9

Refrigerant circuit

AURAX MINI NI 2 AND 4 PIPES

		AM 10 Ni	AM 15 Ni	AM 15 Ni 400 V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
number of circuits		1	1	1	1	1	1	1	1
number of compressors		1	1	1	1	1	1	1	1
compressor type		BLDC Rotary Compressor							
refrigerant gas type		R290							
refrigerant charge	kg	1,8	1,8	1,8	3,1	3,1	3,3	3,3	3,3
GWP IPCC AR5 (100 years)		3							
GWP IPCC AR6 (100 years)		0,02							
number of fans		1	1	1	1	1	1	1	1
rated air flow rate, outdoors		4317	4198	4198	13553	13553	16169	16169	17434
diameter of fan	mm	510	640	640	800	800	910	910	910



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

TECHNICAL SPECIFICATIONS

Electrical Data

AURAX MINI NI 2 AND 4 PIPES

		AM 10 Ni	AM 15 Ni	AM 15 Ni 400 V	AM 20w Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
supply voltage/ phase/freq.	V/ph/ Hz	230/1+PE+N/ 50 Hz	230/1+PE+N/ 50 Hz	400/3+PE+N/ 50 Hz	400/3+PE+N/ 50 Hz	400/3+PE+N/ 50 Hz0	400/3+PE+N/ 50 Hz	400/3+PE+N/ 50 Hz	400/3+PE+N/ 50 Hz
nom. power input	kW	1,54	2,68	2,68	3,1	3,91	4,92	5,16	6,47
max. power input	kW	3,9	5,9	5,7	8,9	9,6	12,2	13,2	14,2
nom. absorbed current	A	7,44	12,95	4,55	5,26	6,64	8,35	8,76	10,99
max. and startup absorbed current	A	14	22	14	16	18	22	26	30

Combined mode

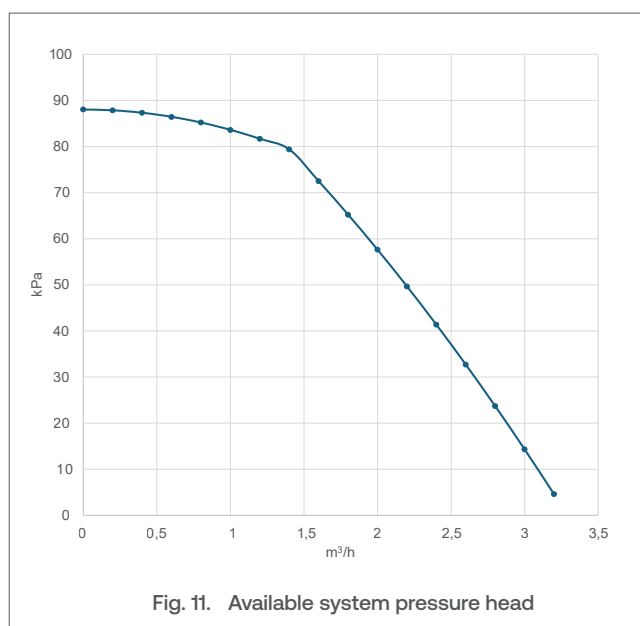
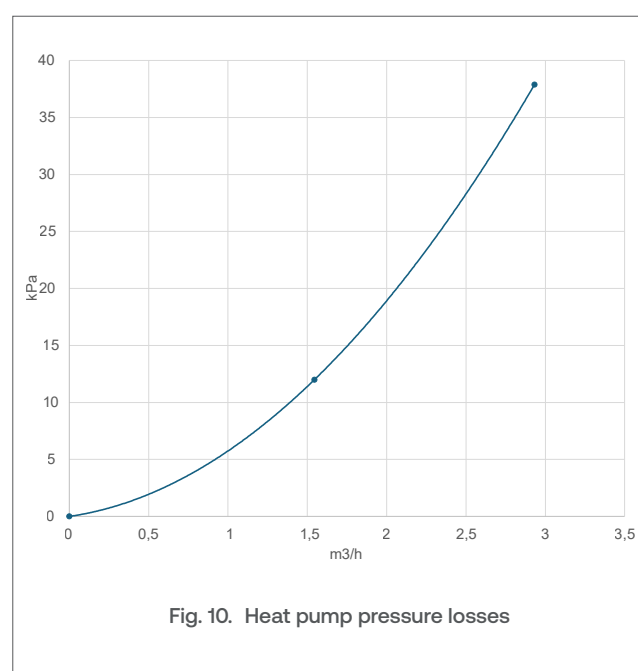
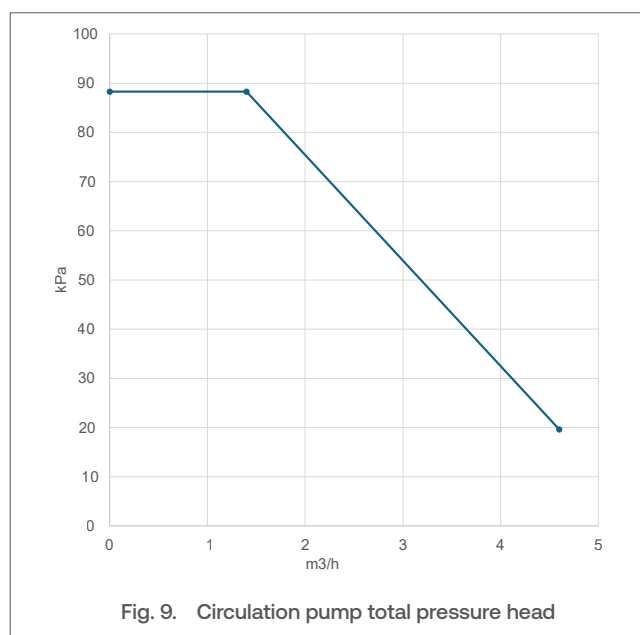
AURAX MINI NI 4 PIPES

(DHW 55°C - W18°C)		AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
domestic hot water capacity	kW	13,43	21,33	21,33	26,26	31,92	40,75	45,12	52,72
cooling capacity	kW	10,29	15,27	15,27	20,28	24,38	30,98	33,87	37,95
COP		4,28	3,52	3,52	4,38	4,23	4,17	4,01	3,57
EER		3,28	2,52	2,52	3,38	3,23	3,17	3,01	2,57
TER		7,56	6,04	6,04	7,76	7,46	7,34	7,02	6,14
(DHW 55°C - W7°C)		AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
domestic hot water capacity	kW	10,18	16,39	16,39	19,39	23,99	30,92	34,43	40,71
cooling capacity	kW	7,27	10,91	10,91	13,83	16,96	21,72	23,92	27,07
COP		3,50	2,99	2,99	3,47	3,41	3,36	3,28	2,98
EER		2,50	1,99	1,99	2,48	2,41	2,36	2,28	1,98
TER		6,00	4,98	4,98	5,95	5,82	5,72	5,56	4,96

AURAX MINI NI 4 PIPES

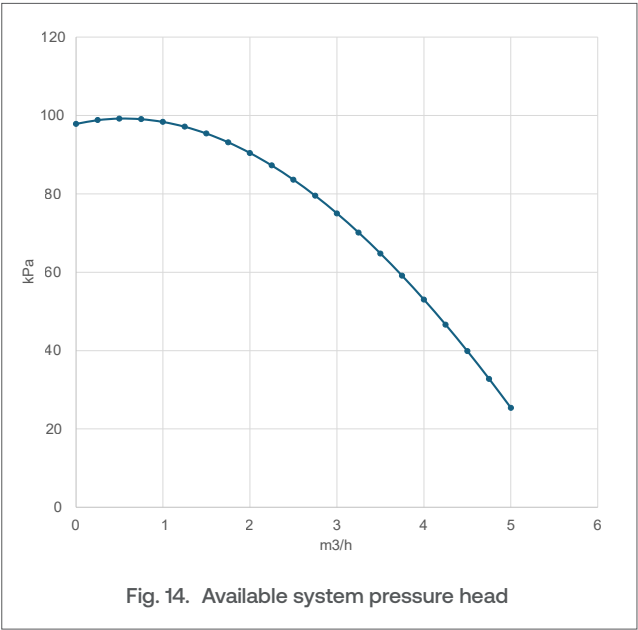
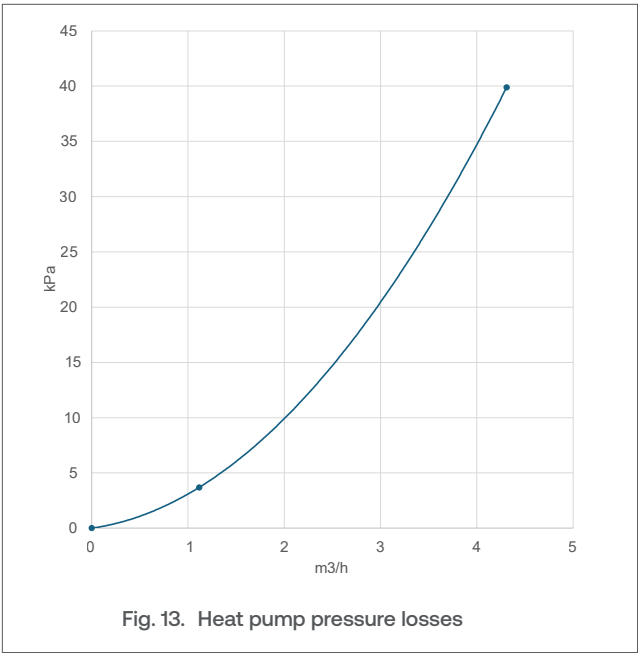
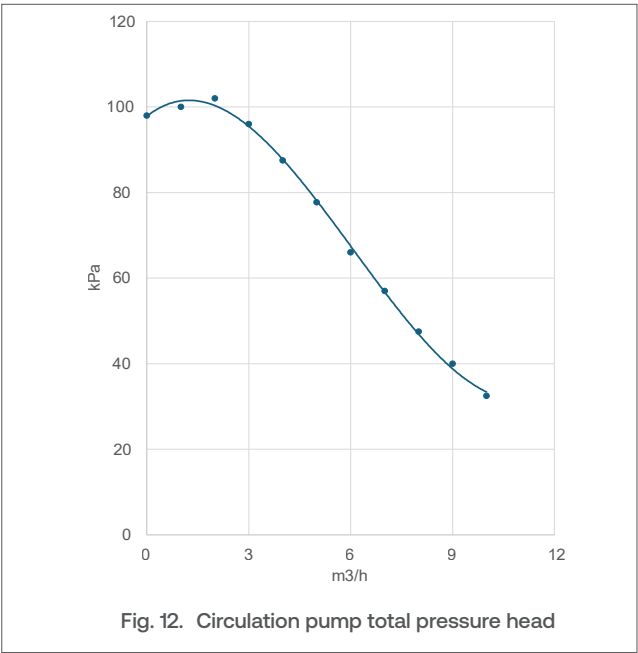
DHW Circuit Hydraulic Data		AM 10 Ni	AM 15 Ni	AM 15 Ni 400V	AM 20 Ni	AM 25 Ni	AM 30 Ni	AM 35 Ni	AM 40 Ni
minimum water tank volume	l	133	205	205	269	323	426	473	540
recommended water tank volume	l	265	410	410	538	647	852	945	1080
water flow rate	m³/h	1,59	2,46	2,46	3,23	3,88	5,11	5,67	6,48
water pressure drop	kPa	9,34	20,73	20,73	20,2	28,18	20,25	24,47	31,17
max. operating pressure	MPa	1	1	1	1	1	1	1	1

Primary circulation pump (2-Pipes only) – Aurax Mini Ni 10-15

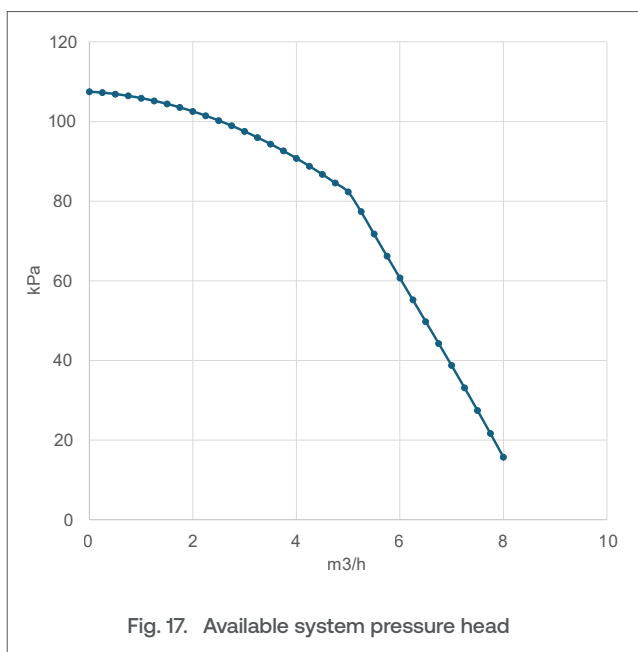
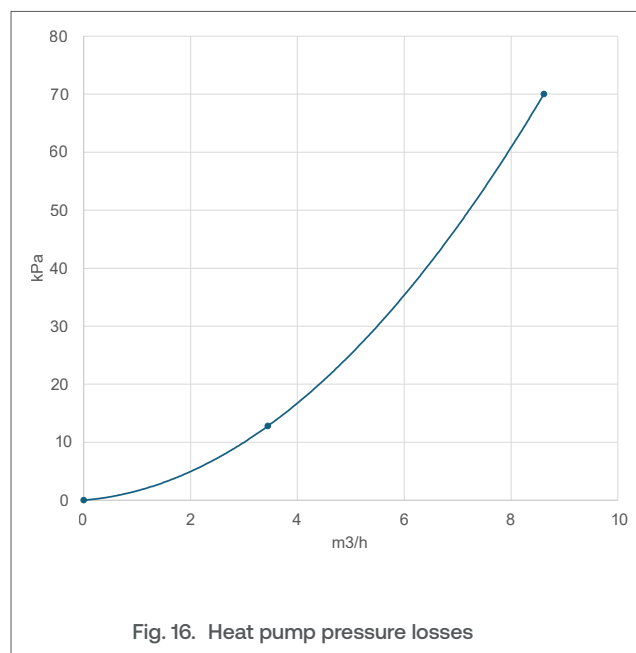
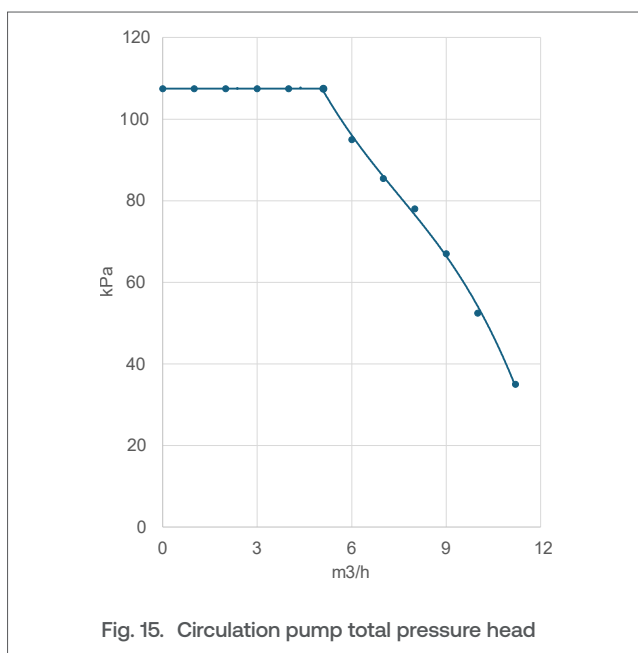


Some of components as a filter or shut-off valve may reduce the available pressure. It is recommended to estimate the pressure losses in the entire heating system to ensure the water flow will be sufficient to reach the required heating capacity. The diagrams above can be useful to check if the built-in circulation pump is adequate to eliminate the pressure losses throughout the entire heating system.

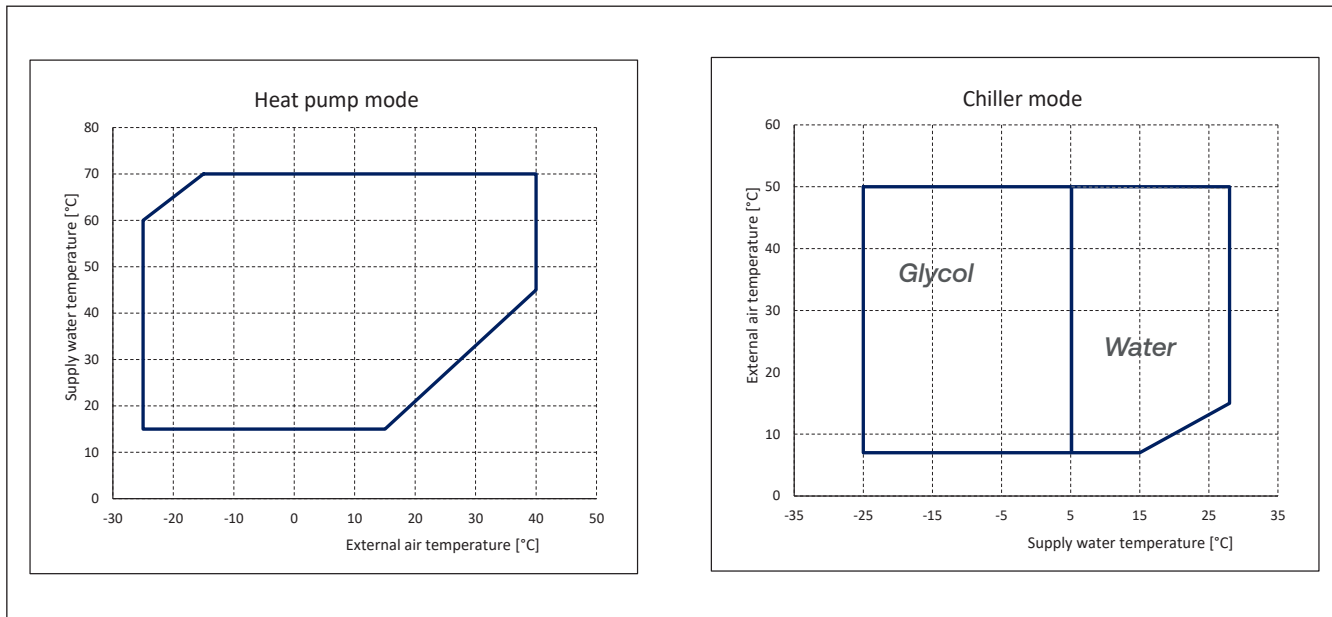
Primary circulation pump (2-Pipes only) – Aurax Mini Ni 20-25



Primary circulation pump (2-pipe only) - Aurax Mini Ni 30-35-40



Limits of Operation



Water flow rate utility exchanger

The nominal water flow rate refers to a temperature difference between the inlet and outlet of the utility heat exchanger of $\Delta t = 5^\circ\text{C}$.

The maximum permissible flow rate is that with a thermal jump of $\Delta t = 3^\circ\text{C}$. Lower thermal jump values may result in too high pressure drop. The minimum permissible flow rate is that with a thermal jump of $\Delta t = 8^\circ\text{C}$.

Insufficient water flow rates can cause abnormal temperatures in the refrigeration circuit with the tripping of safety devices and unit shutdown.

Utility hot water temperature (winter operation)

Once the system has come up to speed, the temperature at the inlet of the utility and/or DHW exchanger should not fall below 30°C . Lower values may cause compressor malfunctions with the possibility of breakdown. The minimum inlet water of the utility heat exchanger during the heating start-up is 5°C . The maximum water outlet temperature of the utility exchanger must not exceed 70°C . Otherwise, the action of the safety devices will stop the unit.

Chilled water temperature

The minimum permissible temperature at the outlet of the utility exchanger is 5°C : for lower temperatures the unit needs modifications. In this case contact our technical department.

The maximum water temperature produced is 27°C .

Outdoor temperature

The units operate in heating mode with an outdoor temperature between -25°C and 40°C .

They operate in chiller (cooling) mode with an outdoor temperature between 8°C and 50°C .

Correction factors

Operating limits

	Cooling		Heating		DHW Heating recovery	
	MIN	MAX	MIN	MAX	MIN	MAX
Inlet water temp.	9 °C	35 °C	20°C*	65 °C	20°C*	65 °C
Outlet water temp.	6 °C	27 °C	25 °C	70 °C	25 °C	70 °C
Air ambient temperature	8 °C	50 °C	-25 °C	40 °C	-25 °C	40 °C

* 15 °C for heating start-up

Ethylene Glycol	12%	22%	30%	36%	40%	44%	48%
Propylene Glycol	16%	26%	34%	40%	44%	48%	52%
Freezing point	-5 °C	-10 °C	-15 °C	-20 °C	-25 °C	-30 °C	-35 °C
Cooling capacity correction factor	0,9848	0,9786	0,9730	0,9688	0,9660	0,9636	0,9600
Power input correction factor	0,9990	0,9940	0,9900	0,9870	0,9850	0,9810	0,9770
Mixture flow correction factor	1,0292	1,0162	1,0920	1,1208	1,1400	1,1640	1,1880
Pressure drop correction factor	1,0716	1,1292	1,1900	1,2224	1,2440	1,2704	1,2968



The water flow rate and pressure drop correction factors must be applied directly to the values given for operation without glycol:

- ▷ *The water flow rate correction factor is calculated to maintain the same temperature difference as without glycol.*
- ▷ *The pressure drop correction factor takes into account the different flow rate obtained from the application of the flow rate correction factor.*

TECHNICAL SPECIFICATIONS

Water Quality Guidelines for Air-to-Water Heat Pumps

To ensure optimal performance and longevity of an air-to-water heat pump system, it is crucial to follow these water quality recommendations:

Recommended Water Quality Parameters:

PH.....	7-9,5	Oxigen O ₂	5-10 mg/l
Electrical conductivity.....	100-700 µS/cm	Nitrates.....	< 5 mg/l
Solphates SO ₄	< 100 mg/l	Ammonia.....	None
Bicarbonate HCO ₃	< 200 mg/l	Hydrogen sulfide H ₂ S.....	None
Chloride Cl.....	< 50 mg/l	Chlorite.....	None
Phosphate PO ₄	< 2 mg/l	Free chlorine.....	< 0,2 mg/l
Carbon dioxide CO ₂	< 5 mg/l		

Safety Instructions for the User



- ▶ This appliance 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.
- ▶ Do not store any flammable, corrosive or explosive products near the appliance.
- ▶ Do not modify or deactivate any component, nor any safety device in the system.
- ▶ Do not operate the appliance when the casing is open.

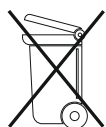


- ▶ Do not modify any part of the electrical system or access internal components.
- ▶ Do not touch the appliance with any wet body parts when the appliance is supplied with electrical power.
- ▶ Electrical devices with ignition sources and mobile devices with batteries must be strictly avoided within the safety area.



- ▶ Do not modify or block the condensate outlet(s).
- ▶ Do not open any sealed part or component. Failure to comply with this instruction can result in damages and/or injuries.
- ▶ Make sure the appliance and the heating system are prevented from freezing.
- ▶ In case of water leakage, disconnect the appliance from the power supply, turn off the water supply and call a qualified professional.
- ▶ In case of abnormal noises in the system or the appliance, please notify a qualified professional.
- ▶ Any setting of the appliance by the end-user using the installer-specific functions, that would cause the appliance to malfunction, could 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.*
- ▶ *Pay special attention not to discharge the compressor oil onto the ground or into sewers, waterways, groundwater or seawater.*
- ▶ *If the product contain the fluorinated greenhouse gases, they shall be recycled, reclaimed or destroyed according to the applicable local regulations and by qualified professionals*

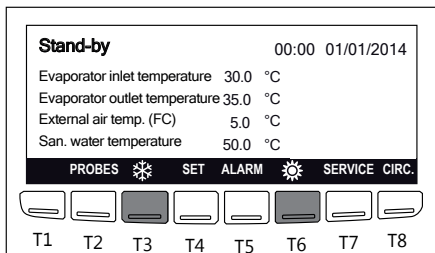
INSTRUCTIONS FOR THE USER

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-16.

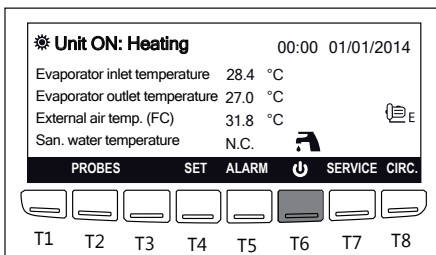
Turning On and Off



Depress:

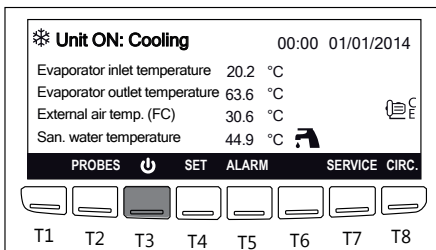
T6 (☀️) to turn on in Heating mode

T3 (❄️) to turn on in Cooling mode

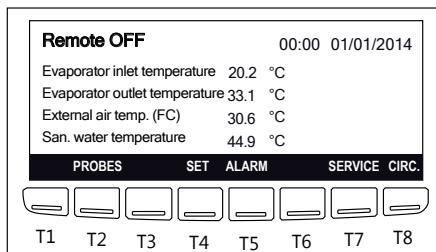


Depress:

T6 (⏻) to turn off in Heating mode



T3 (⏻) to turn off in Cooling mode

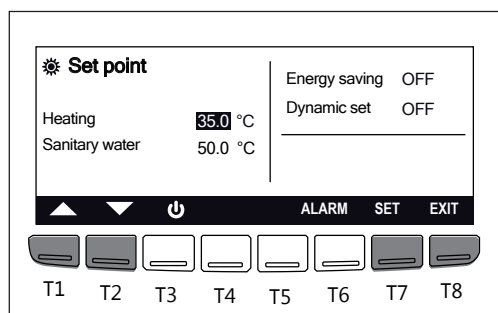
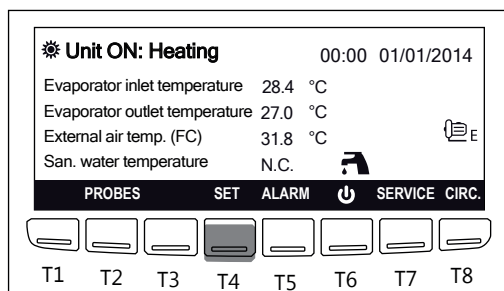


Through the **remote control**, the unit can be turned on and off. If installed, it has priority over manual activation/deactivation.



In this manual, screens displaying the heating functions are shown as an examples. Depending on the active and of the sensors and components installed in the system, the contents of the screens may differ. The principle of operation and navigation through the screens is however identical.

Definition of Setpoints - SET Function



Depress:

T4 (SET) to access Set point definition screen

Depress:

T1 (▲) / T2 (▼) to navigate through the set points.

T7 (SET) to select the value (starts blinking).

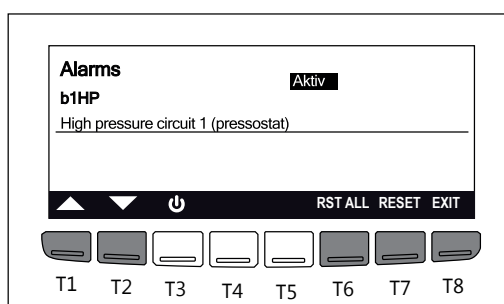
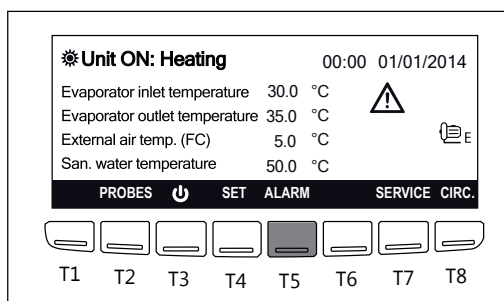
T1 (▲) / T2 (▼) to increase/decrease the value.

T7 (SET) to confirm the value.

T8 (EXIT) to exit the screen and return to the home screen

Refer to “Setpoints” on page I-69 for the temperature ranges and default values.

Resetting an Alarm - ALARM Function



If  is blinking on the screen, an alarm has occurred

Depress:

T5 (ALARM) to display the alarm status :

- ▶ **Active** : cannot be reset because it is still active
- ▶ **Password** : no access for the end-user. Please contact your installer/AIC representative
- ▶ **Reset** : alarm is not active and can be removed as follows :

T1 (▲)/T2 (▼) to select the alarm to be deleted

T7 (RESET) to delete one alarm at a time

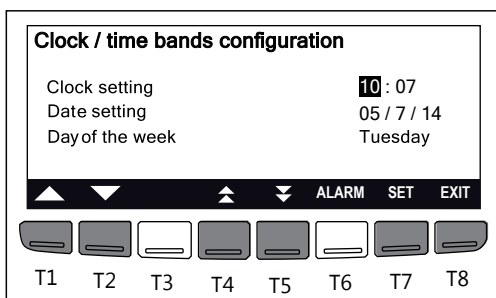
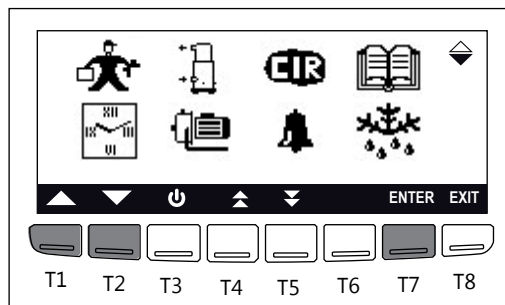
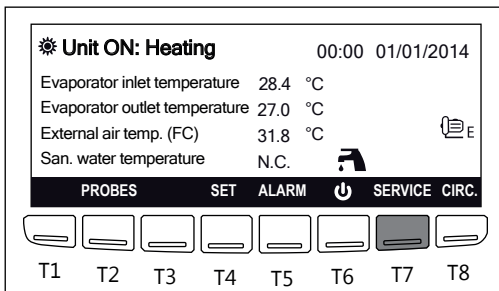
T6 (RST ALL) to delete all the resettable alarms

T8 (EXIT) to exit the screen and return to the home screen



If an alarm buzzer is sounding, it can be stopped by pressing and releasing any of the keys.

Setting the Time and Date



Depress:

T7 (SERVICE) to access the **Service** screen

Depress:

T1 (▲) / T2 (▼) to select the  icon.

T7 (ENTER) to confirm and access the **Date and Time** screen

 *When an icon is selected, it is displayed on a black background.*

Depress:

T1 (▲) / T2 (▼) to scroll through the lines.

T7 (SET) to select the value. It starts blinking.

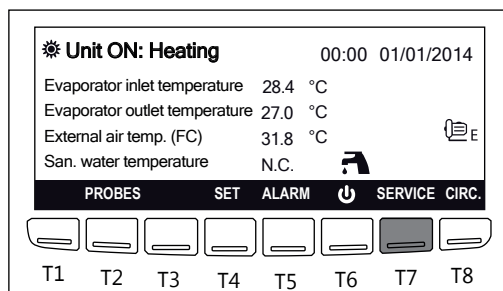
T1 (▲) / T2 (▼) to increase/decrease the value.

T7 (SET) to confirm the value.

T4 (▲) / T5 (▼) to read the info about the Energy saving, ON/OFF scheduling and time bands on other screens (cannot be modified by the end user).

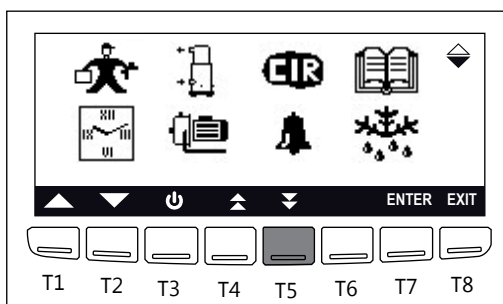
T8 (EXIT) to exit the menu

Control panel screen and Language Setup



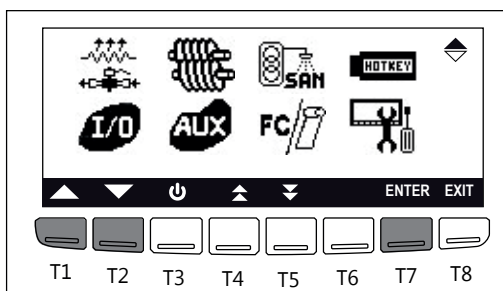
Depress:

T7 (SERVICE) to access the Service screen



Depress:

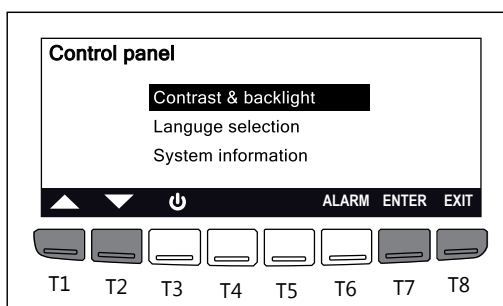
T5 (▼) to access the second screen of icons



Depress:

T1 (▲) / T2 (▼) to select the icon.

T7 (ENTER) to confirm and access the Control panel screen



Depress:

T1 (▲) / T2 (▼) to scroll through the lines.

T7 (ENTER) to select the line and perform the required adjustments :

- Contrast and backlight
- Language selection

or read information:

- System information

T8 (EXIT) to exit the menu and go back to the home screen.

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 EN 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 outdoor installation.
- Do not install the unit in the vicinity of trees or under an overhang.
- Comply with the clearance dimensions provided in this manual.
- It is essential to ensure adequate air volume to the source fan. Avoid recirculation of discharge air; failure to observe this point will result in poor performance or activation of safety controls
- In defrost mode, the heat exchanger will produce condensates, which can create a thick layer of ice if the ambient temperature is below 0 °C. It is therefore recommended to raise the unit by a minimum height of 350 mm to prevent damage to the heat exchanger due to ice formation.
- Install the unit in such a way as to prevent a slipping hazard to the user or third parties due to the presence of ice around the heat pump.
- Make sure to protect the unit and the circuits against freezing.
- If the unit is installed in windy areas, where the wind speed is greater than 2.5 m/s, it is necessary to use wind barriers or increase the distance between the heat pumps by 0.8 m and the distance between the wall and the heat pump by 0.5 m to prevent malfunctions. In their standard configuration, the units are not suitable for installation in saline environments.
- 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 very 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 or, alternatively, belts, making sure not to damage the side panels or covers.
- ▶ During the handling, keep the unit vertically at all time to avoid damage to the internal components.
- ▶ 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.

Safety requirements :



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



▶ The units transmit a low level of vibration to the ground; however, it is advisable to interpose antivibration mounts between the base frame and the ground plane.

- ▶ It is very important to avoid recirculation phenomena between air inlet and air outlet, otherwise the performance of the unit will be degraded or even normal operation will be interrupted. In this regard, it is necessary to ensure the minimum service spaces, refer to “Location of the unit” on page G-19.

Unpacking the Unit

Safety requirements :



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

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



The maximum ambient storage/transport temperature is +45 °C , the minimum is 2 °C.

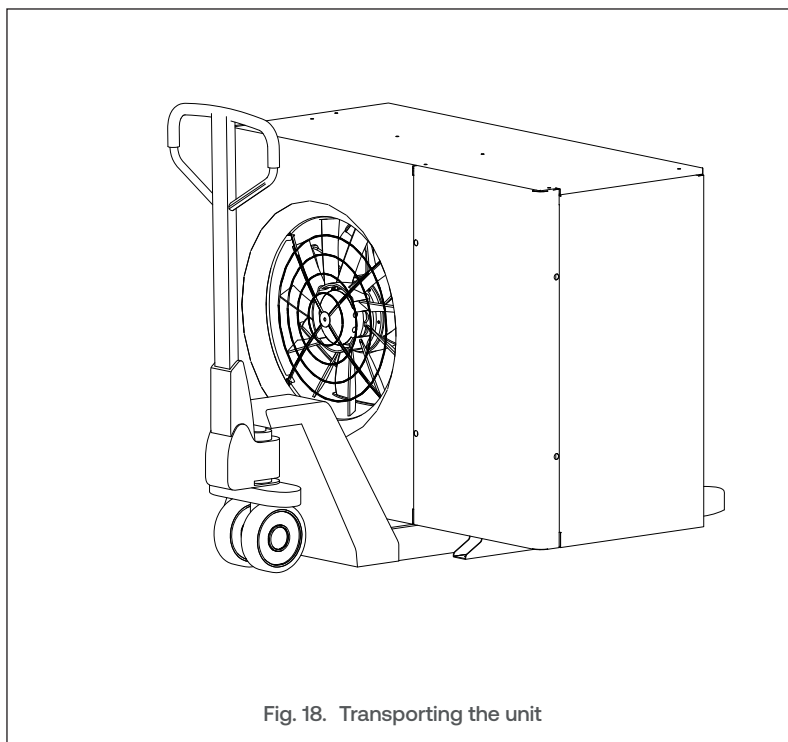


Fig. 18. Transporting the unit

Installing and Preparing the Unit

Safety requirements :



Caution :  **Heat exchanger fins**



Make sure to comply with the recommended clearances for the unit installation, refer to “Location of the unit” on page G-19.

- Make sure to comply with all the safety instructions for the installation, as defined **on page I-40**.
- All units are equipped with a condensate tray, which is located below the exchanger (finned coil), collects the condensate water produced by the unit in heating and domestic hot water modes.



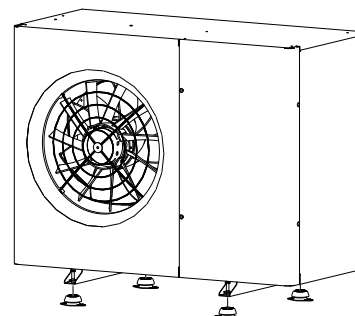
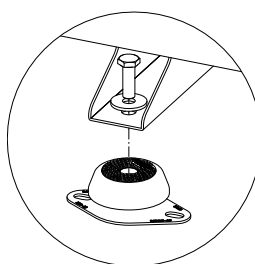
Provide a heating cable in the discharge pipe to prevent condensate water from freezing in the pipe, which could disturb the correct operation of the unit.

Installing antivibrating dampers

Safety requirements :



To avoid the transmission of vibrations, it is recommended to install antivibration dampers on the feet of the unit.



Opening and Closing the Panels

Conditions:



Tools and Material:

- Wrench, flat, size 10

Removal Procedure:

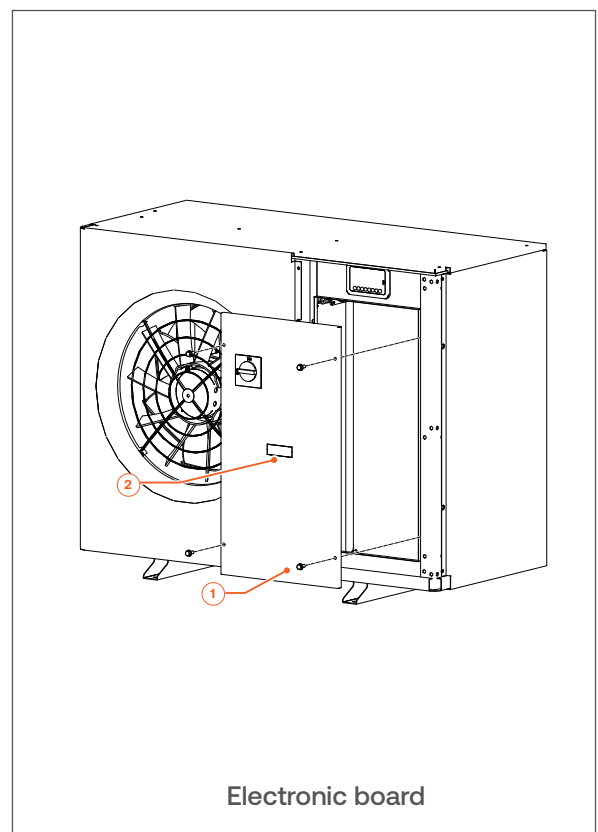
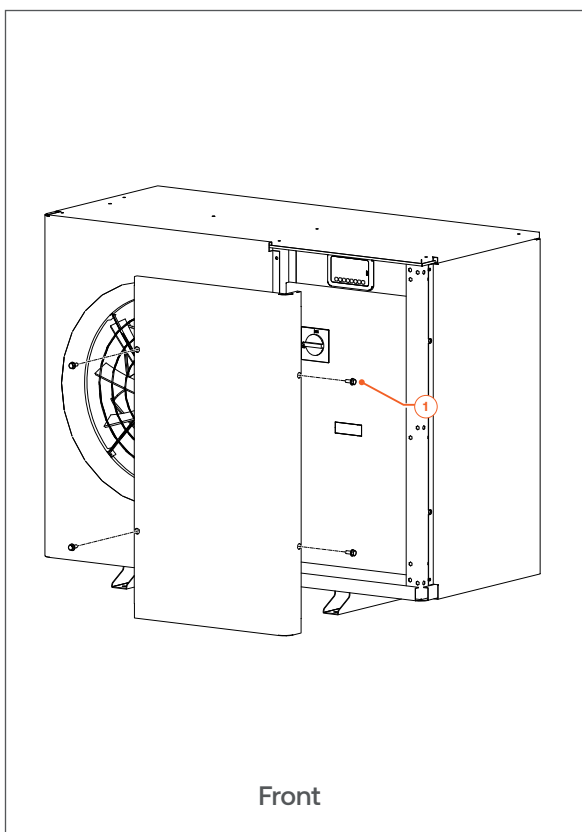
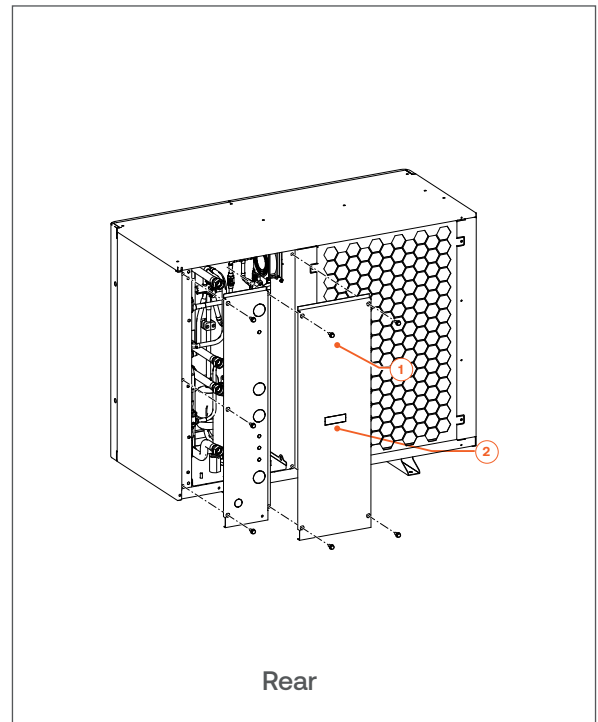
Front panel and Electronic board

- Using a wrench, remove the screws (1) around the front panel. Retain for reinstallation.
- Lift and remove the front panel.
- Remove the 4 screws, using a wrench. Lift the panel using the built-in holder (2) and set aside.
- Perform procedure in reverse order to close the front panel and electronic board.

Side and Rear Panels

- Using a wrench, remove the screws (1) around the access door. Retain for reinstallation.
- Lift the access door using the built-in holder (2) and set aside.
- Perform procedure in reverse order to close the door(s).

Follow on tasks: none



Safety Instructions for the Hydraulic Connections

Primary Circuit



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



▶ The pressure of the water network used to fill the appliance must be at least 2 bar.

- ▶ If the supply pressure from the network is higher than 6 bar, the system will be protected by a safety valve for water calibrated to 6 bar. Verify the water quality of the network according to the requirements, refer to “*Water Quality Requirements*” on page I-25.
- ▶ In case corrosion inhibitors are used in the system, consult the manufacturer for product suitability.
- ▶ Any antifreeze used in the primary circuit must comply with Public Hygiene Regulations and must be non-toxic. A food-grade Propylene Glycol is recommended. It must be diluted according to the ratio recommended in the local regulations and in percentage appropriate to the operating conditions of the unit (evaporating temperature).



- ▶ *The use of antifreeze in the primary circuit will lead to a reduction in the heating performance. The higher the concentration of antifreeze in the circuit, the lower the performance. Maximum output must be adjusted accordingly.*
- ▶ *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.
- ▶ The hot water produced in the circuit can reach 70 °C temperature and cause scalding when drawn from a tap. The installation of a thermostatic mixing valve is therefore recommended.



- ▶ 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.
- ▶ 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.



- ▶ The pressure of the water network used to fill the appliance must be at least 2 bar.
- ▶ The supply pressure from the network must be comprised between 2 and 6 bar. If the pressure is higher than 6 bar, the system will be protected by a safety valve for water calibrated to 6 bar.
- ▶ Flush thoroughly the circuit before operation.
- ▶ Pipes for DHW should be made from copper or galvanized steel.

Requirements for the Hydraulic Connections



Restarting the unit after a long period, verify the circulation pump is operating, if it is installed. If the pump is blocked by calcareus, turn it by hand moving the back side cooling fan after removing the back protection cover.



- ▶ Install the water pipes in accordance with national and local regulations.
- ▶ Pipes for air conditioning should be made from copper, galvanized steel or PVC.
- ▶ Design the pipe work to meet the nominal water flow and hydraulic pressure drops of the system. The maximum pressure drop is typically of 300 Pa/m.
- ▶ Insulate all pipes with closed-cell material of adequate thickness.
- ▶ Make sure the water return system fits into the connection labelled: "WATER INLET". An incorrect connection can generate underperformance damage to the heat exchanger by freezing.
- ▶ Ensure the metal mesh of the water filter, has a size between 500 - 800 µm.
- ▶ Check the filter regularly and keep it clean.
- ▶ In standard configuration, a flow switch, supplied with the unit, must be fitted to the connection labelled "WATER INLET".

To lengthen the life of the unit and hydraulic circuits, the following equipment is recommended to be installed:

- ▶ 2 gauges of right scale (inlet and outlet),
- ▶ 2 shut-off valves (inlet and outlet),
- ▶ 2 antivibration joints (inlet and outlet),
- ▶ 2 thermometers (inlet and outlet).

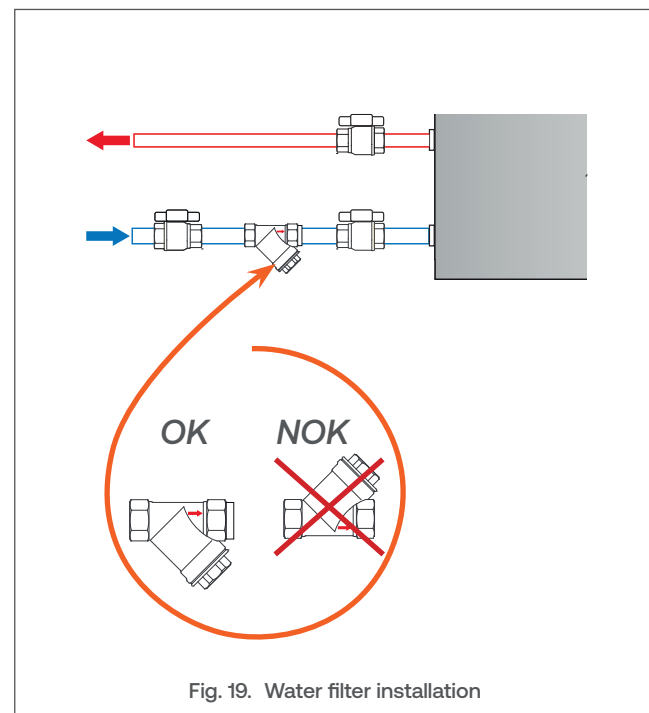


Fig. 19. Water filter installation



See the following pages for examples of standard systems and DHW-production ones.

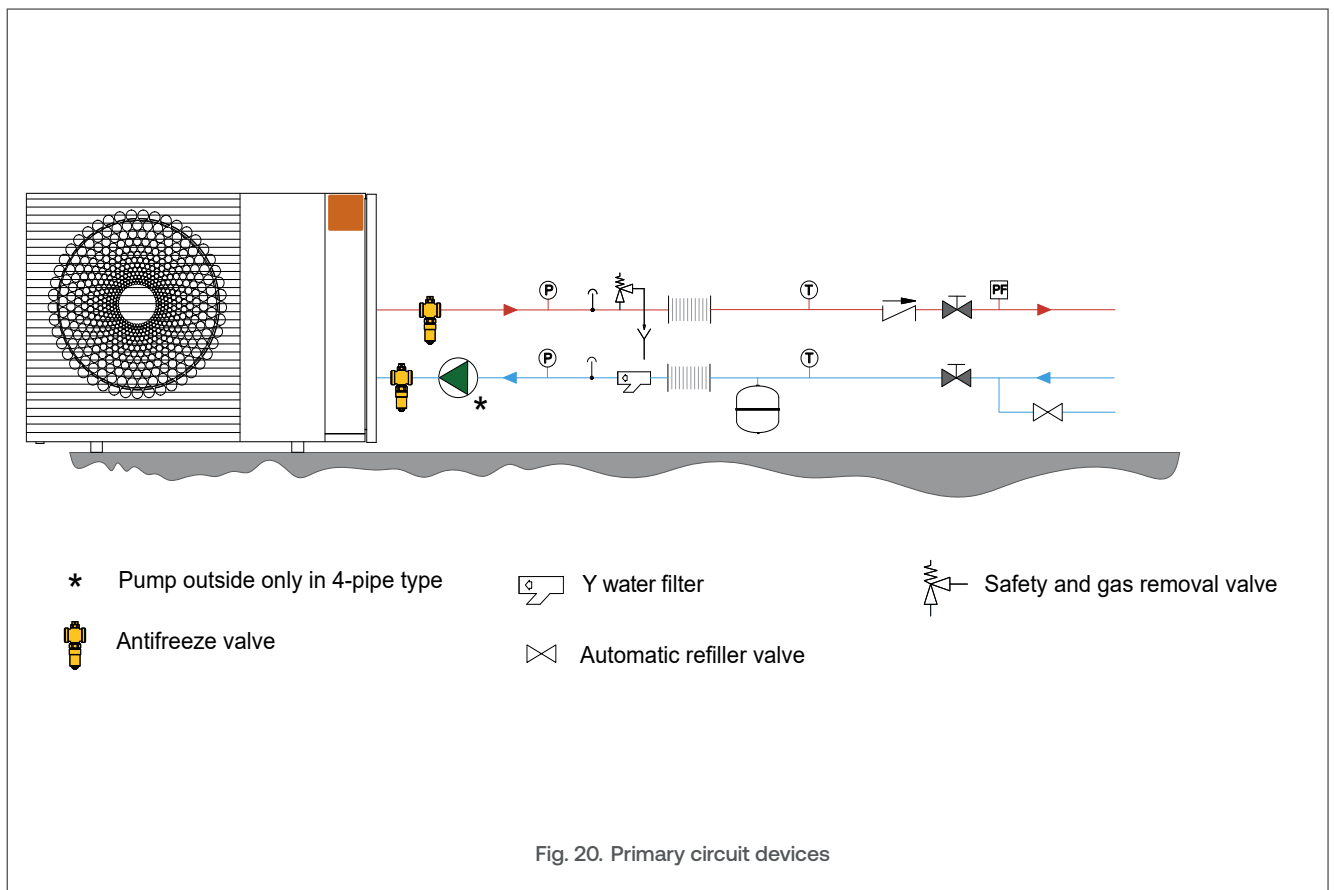
Typical Hydraulic Connections - Primary

Pipelines must be carefully sized according to the unit's nominal water flow rate and the pressure drop in the hydraulic circuit.

The liquid velocity should be kept below 2 m/s. Either for the pump installed in the unit (2-pipe) or supplied separately (4-pipe) the residual head of the pump should be checked. Please refer to **"Primary circulation pump" on page G-29**.

All hydraulic connections must be insulated with closed-cell material of adequate thickness.

The unit must be connected to the pipeline using appropriate flexible couplings: rubber expansion compensators.



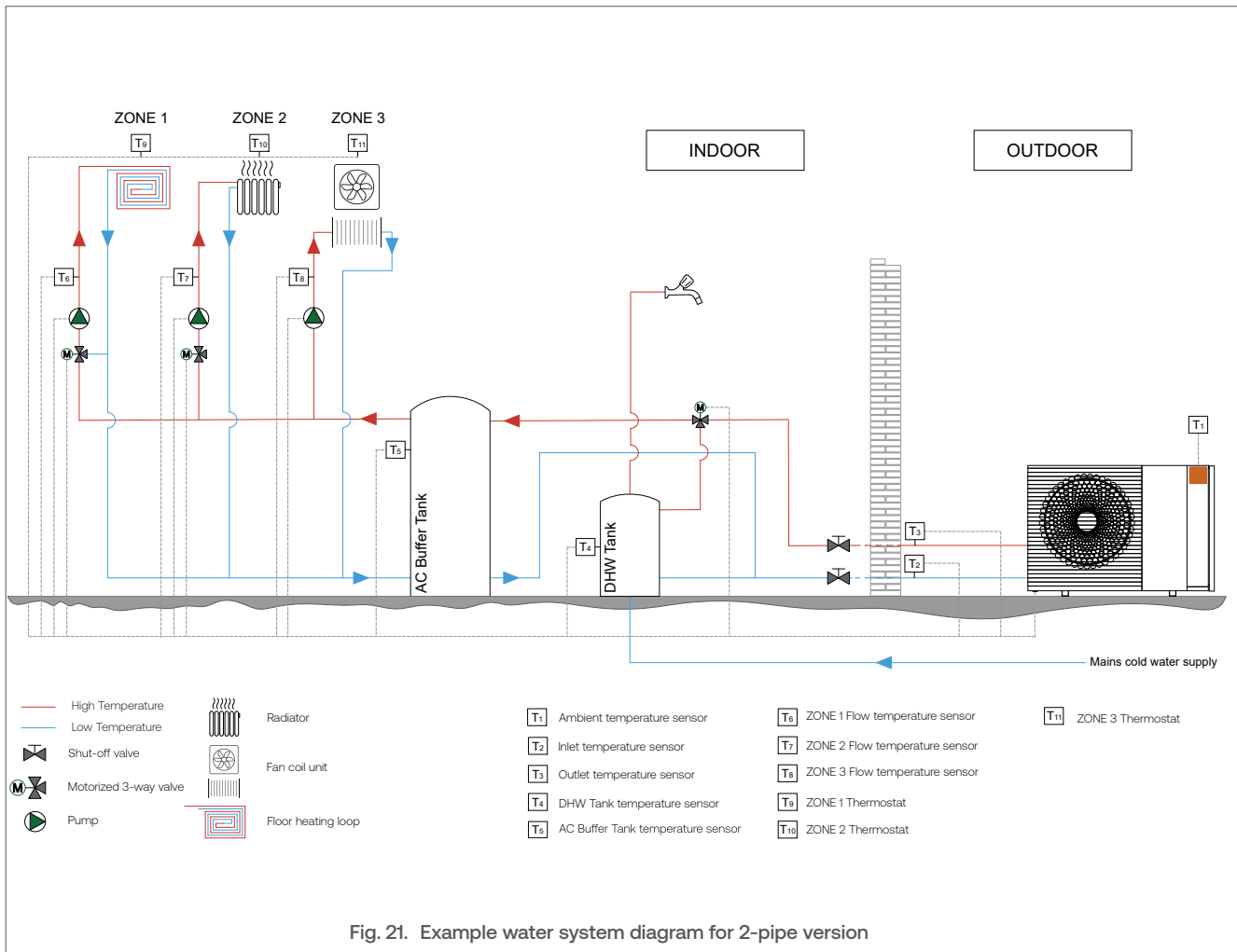
PRODUCT INSTALLATION

System for the Production of DHW / Heating / Cooling

2 - Pipe system

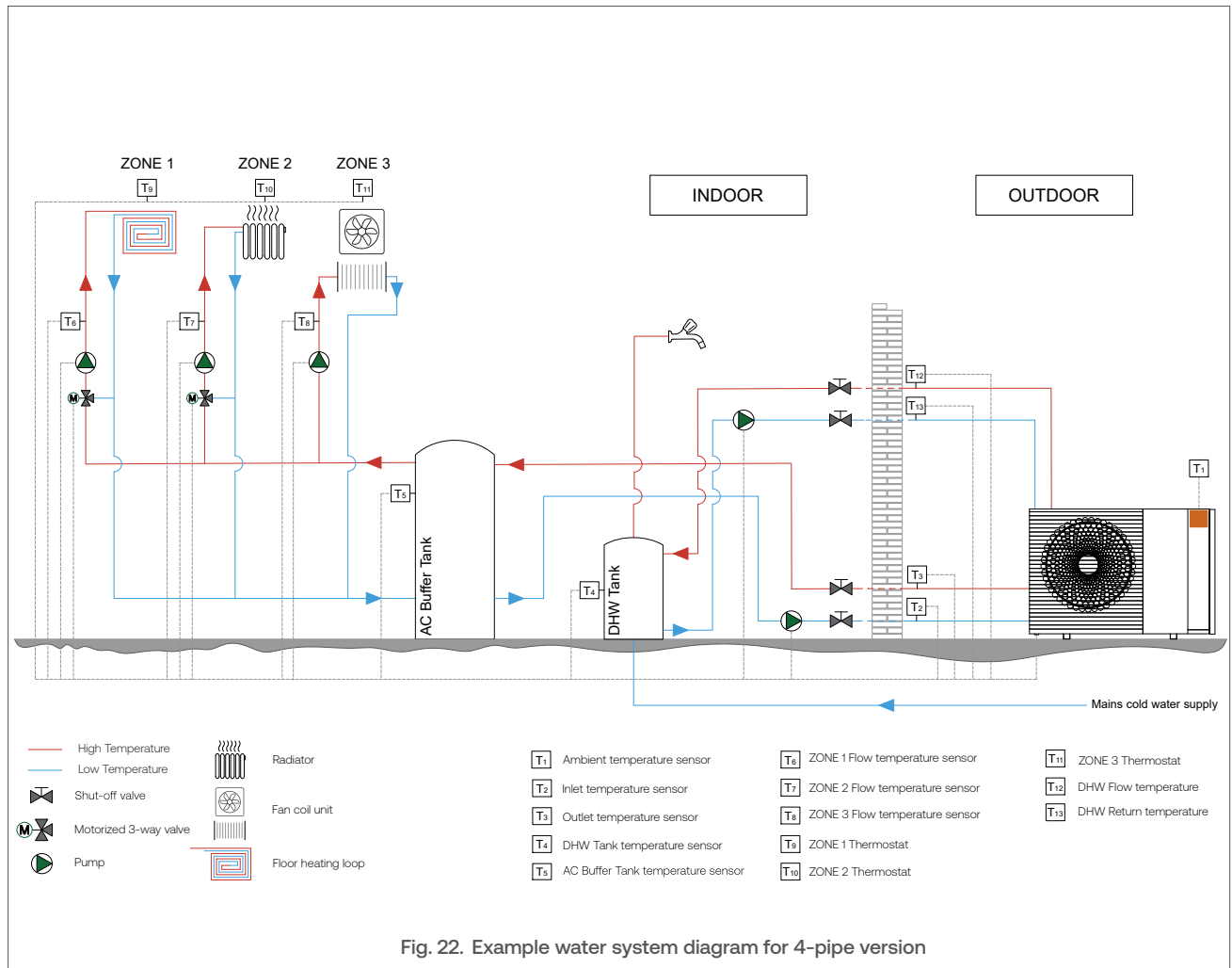
The system uses water stored in the accumulation (AC) buffer tank. This water is maintained at a temperature up to 70 °C which is sufficient to prepare DHW and radiator/fan coil flow temperatures in an efficient way. With addition of AC buffer tank, the heat pump will work continuously without frequent starts

and stops of the compressors, which adds to the system longevity. In summer, when the user requires chilled water, the heat pump is in cooling mode and switches to heating mode when the preparation of DHW is demanded.



4 - Pipe system:

This solution will work best when using the cooling mode. The 4-pipe system allows simultaneous operation in cooling mode and simultaneous DHW heating. The advantage of this solution is the energy saving resulting from the external fan being switched off during Cooling + Heating operation.



The heat pump has to be connected to the AC buffer tank. This is required to guarantee the correct operation of the unit, avoiding frequent start and stops of the compressors. Please contact your AIC representative for correct sizing of the AC buffer tank.

PRODUCT INSTALLATION

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

Power supply connection

1. Grounding PE connection. ①
2. High Voltage wiring is connected to a main switch, located in the heat pump electrical box. ②
3. External interface terminal block. ③

The main board and the low-voltage terminal strip are also located at the front of the heat pump.

Wirings optional connections

All the units are equipped with the controller that can be connected to BMS remote control system using the Modbus protocol. For information on the number of terminals required to connect the BMS control system, refer to the wiring diagram supplied to the unit.



Signal or control wires (dry contact) must be electrically separated from power cables.

When connecting the external water pump to the unit, the control and alarm terminals shown *on page I-51* must be used.



- ▶ 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.



Terminal block connections

Description	TYPE	TERMINAL BLOCK	PINS	CABLE TYPE	STATUS
AC water tank temperature	Signal - NTC10K	XS	396-397		
AC water pump alarm (optional)	DI - Dry contact	XC	56-57		Open= alarm
DHW TAnk temperature probe for 2 pipe system	Signal - NTC10K	XS	417-418		
DHW TAnk temperature probe for 4 pipe system	Signal - NTC10K	XS	419-420		
Zone 1: mixed water temperature	Signal - NTC10K	XS	421-422	Shielded 2x0.75	
Zone 2: mixed water temperature	Signal - NTC10K	XS	423-424	Shielded 2x0.75	
Only domestic hot water production (no conditioning)	DI - Dry contact	XC	58-59		Closed= ON
Thermostat zone 3	DI - Dry contact	XC	60-61		Closed= ON
On-Off remote	DI - Dry contact	XC	10-11		Closed= ON
Cooling-Heating mode selection	DI - Dry contact	XC	68-69		
CW Pump Thermal	DI - Dry contact	XC	220 - 221		Open= alarm
Thermostat zone 1	DI - Dry contact	XC	66-67		Closed= ON
Thermostat zone 2	DI - Dry contact	XC	62-63		Closed= ON
DHW second setpoint (optional)	DI - Dry contact	XC	64-65		Closed= ON
Zone 1: 3 way valve modulation	Signal 0-10V	XC	610-611		
Zone 2: 3 way valve modulation	Signal 0-10V	XC	612-613		
Zone 3: mixed water temperature	Signal - NTC10K	XS	425-426		
General alarm	DO - Dry contact	XC	30-32		Open= alarm
Zone 1: water pump start-stop	DO - Dry contact	XC	34-35		Closed= start
Zone 2: water pump start-stop	DO - Dry contact	XC	37-38		Closed= start
Zone 3: water pump start-stop	DO - Dry contact	XC	40-41		Closed= start
DHW 3-way water diverting valve n°1	DO - Dry contact	XC	51-52-53		
DHW water pump	DO - Dry contact	XC	49-50		Closed= start
AC water pump	DO - Dry contact	XC	45-46		Closed= start



The numbering of terminals may change without notice. Please always refer to the wiring diagram supplied with the unit.

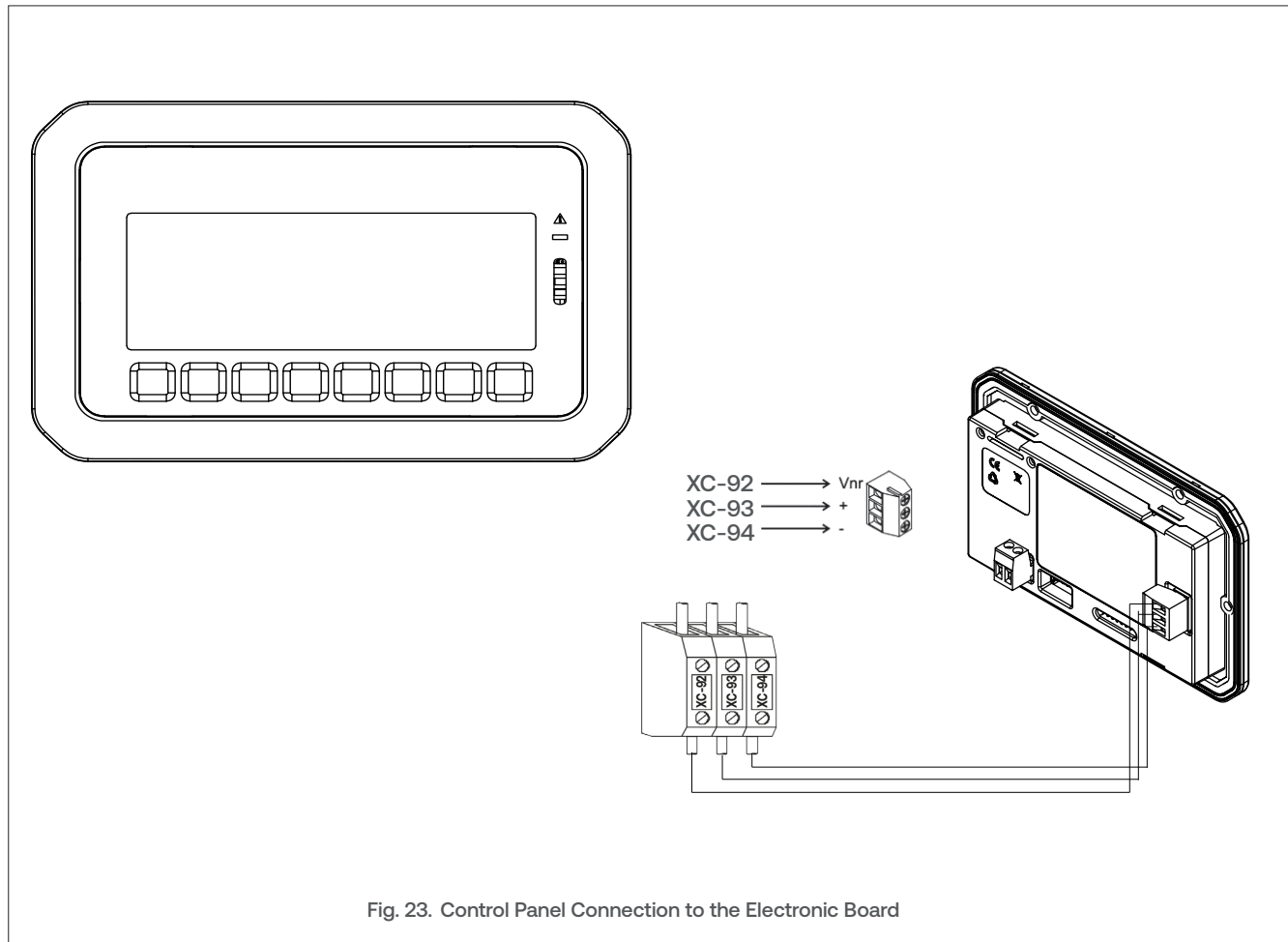
* DI = Digital input, DO = Digital output

PRODUCT INSTALLATION

Installing a Remote Control Panel



- Special care must be taken when connecting the keyboard to the controller, in order to avoid irreparable damage to the PCB and/or control panel.
- In case of power supply failure, the control panel will not work.
- In case of communication problems, the display will show “noL” message.
- If an external display is used, disconnect built-in display.



The complete wiring diagram is provided with the unit.

RS485 serial interface card as standard

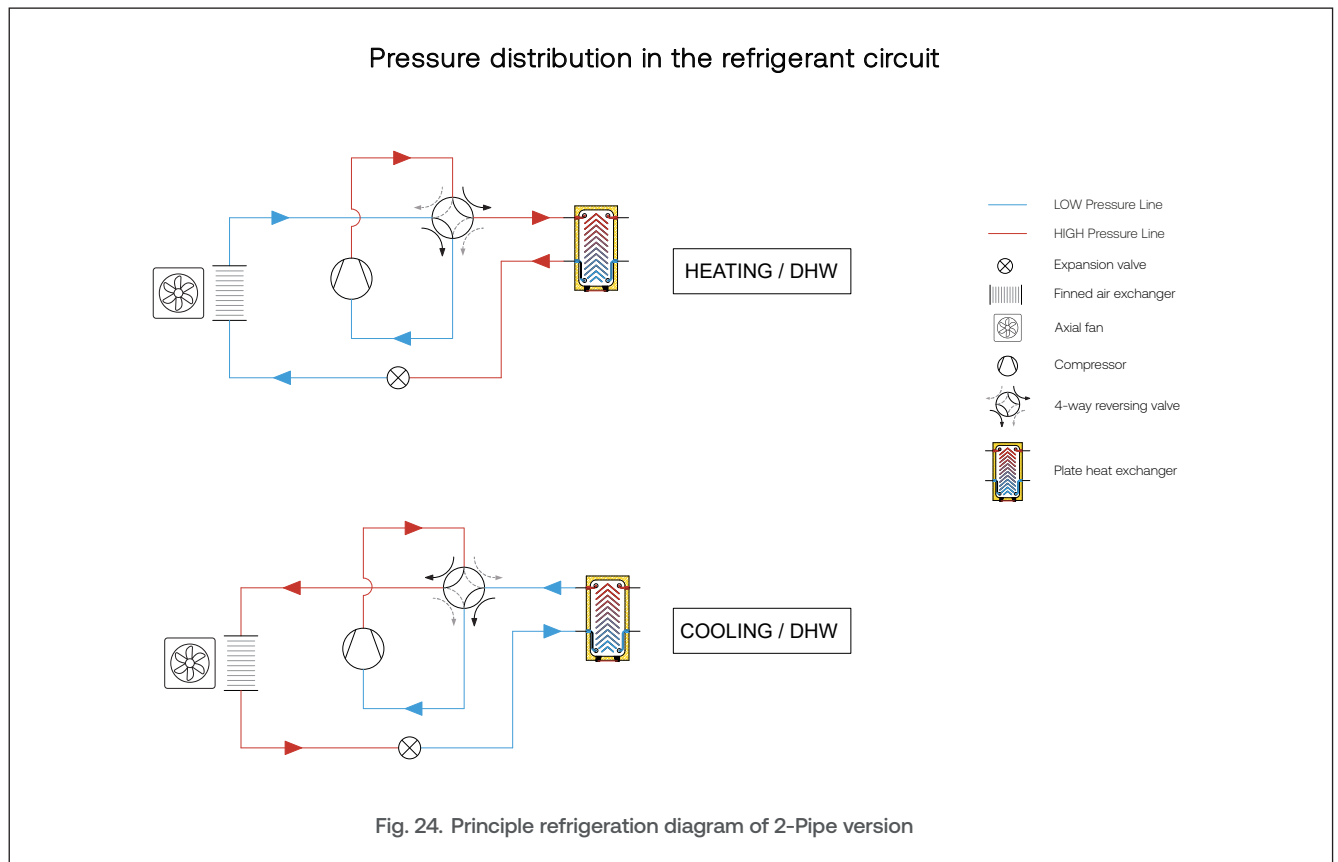
Connection for interfacing to supervisory system, allows remote monitoring of all operating parameters of the unit and changing their values. It is necessary to observe the polarity of the wiring. Any reversal in polarity may result in the unit malfunction. The cable of the supervision connection must be the two-core twisted pair cable with a cross section of at least 0,75 mm² and maximum length 200 m.

The unit is factory configured with serial address 1. When using MODBUS system, the list of variables can be obtained by contacting the service.

Refrigerant Circuit Layout

2 - Pipe system

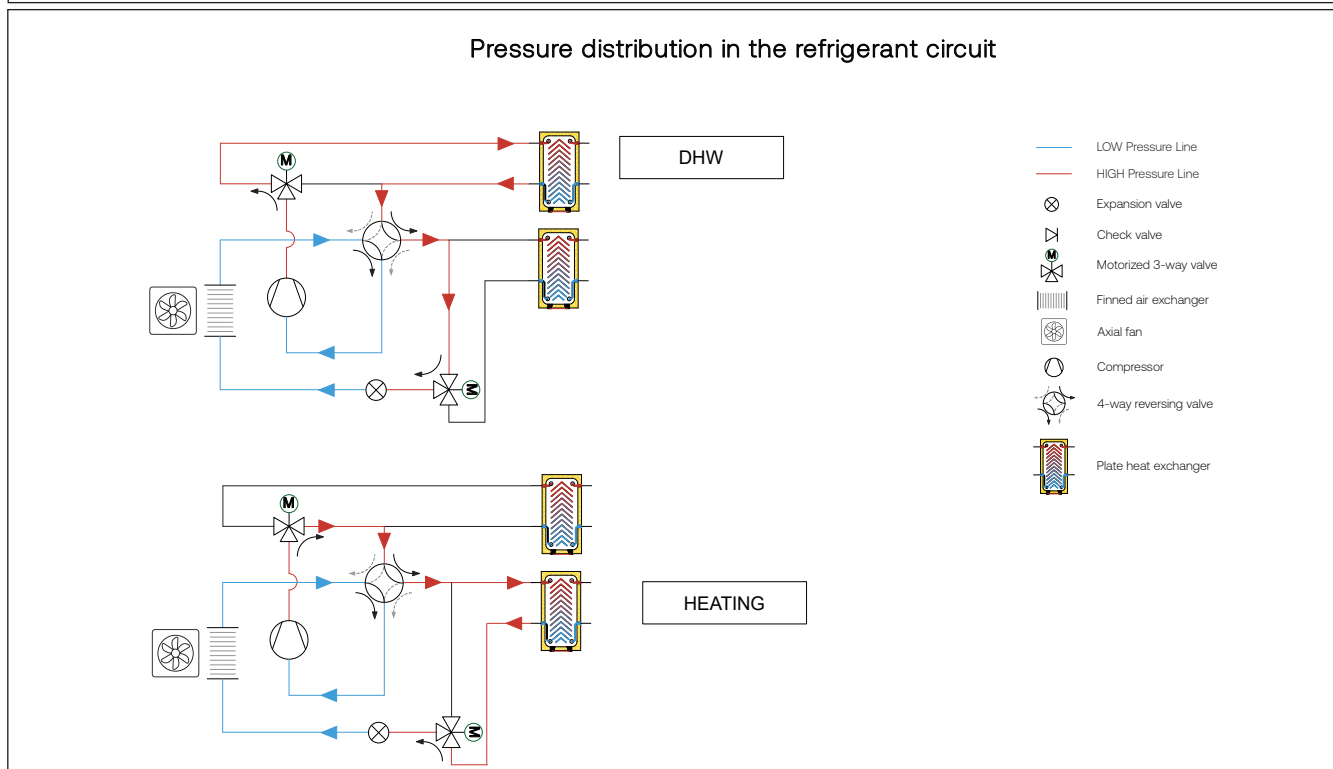
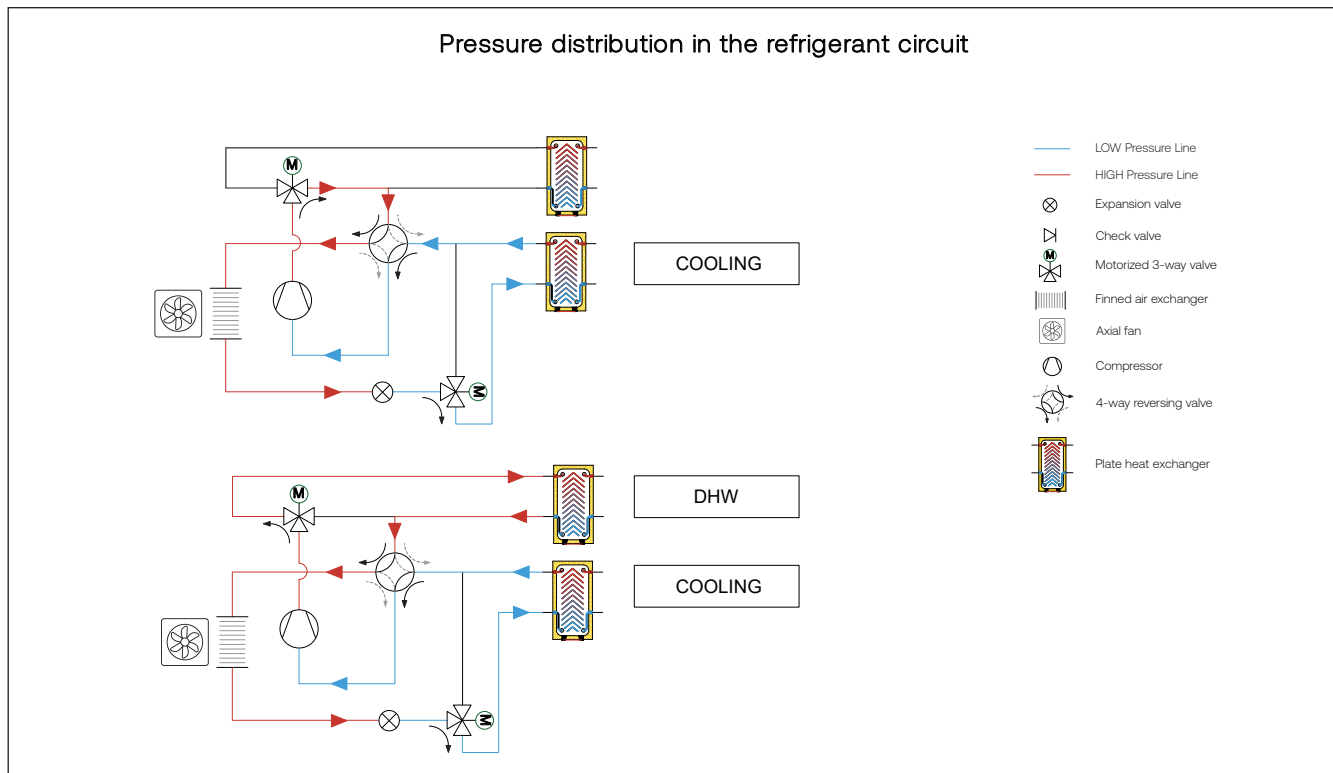
This version uses 2 hydraulic connections and is capable to produce hot water in the winter period, cold water in the summer period, and domestic hot water throughout the year. The unit should be combined with a 2-pipe system and connected to an external 3-way valve (not supplied) for priority domestic hot water production.



4 - Pipe system

This version uses 4 hydraulic connections and is capable to produce hot water in the winter period, cold water in the summer period, and domestic hot water throughout the year. The unit should be combined with a 4-pipe system. Comparing to the 2-pipe system, it has 2 additional connections dedicated for domestic hot water (external 3-way valve is not required). The

4-pipe system has additional plate heat exchanger in refrigeration circuit which can produce simultaneously cold water for air conditioning and DHW. The heat generated as a result of cooling is utilized to heat up DHW.



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 circuits are full of water and that the unit is supplied with electrical power.
- ▶ Before the first startup of the heat pump, install and connect the flow switch in the system.
- ▶ Check that there is no refrigerant leakage and that all taps are open.
- ▶ Check that there are no oil stains, sign of a possible leak.
- ▶ Check that the water pressure is sufficient in the user water circuit (at least 1,5 bar when cold). Top up the circuit as required.
- ▶ If frequent top-ups are necessary, check for leaks and repair as required.
- ▶ Once the filling of the heating circuit is complete, close the filling valve.



Once the initial start-up process is complete, fill in the installation checklist with all the relevant information on the system for future reference. Please refer to checklist included to the manual.

Filling the System

Conditions:



Procedure:

1. Connect water supply to the filling valve.
2. Open all system manual air vents.

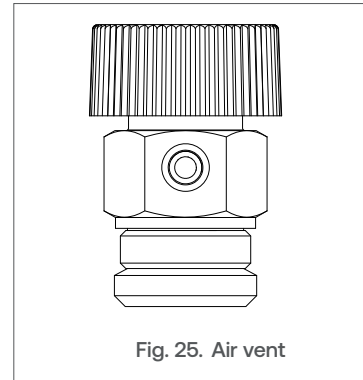


Fig. 25. Air vent

3. Open all shut-off valves and ensure the system is open to one volume.
4. Slowly open the filling valve and water supply flow valve.
5. Keep filling. When water starts leaking from air vent valves, close them, and continue filling until the pressure gauge indicates a pressure of 1,5 bar. When the water is cold, the pressure should be between 1,5 and 3 bar. If the pressure in the system exceeds 3 bar, close the water supply valve and open drain connection until the pressure is between 1,5 and 3 bar.
6. After the whole system is filled with water to the correct pressure, close the filling valve and disconnect water supply.

Follow-on Task(s): None

ADDITIONAL INFORMATION FOR THE INSTALLER

Installing a flow switch

Conditions:  

Safety requirements:  

Tools and Material:

- 2 nylon gaskets
- 2x adjustable wrench;



All units are supplied with a set of a paddle flow switch mounted in a tee connection, which should be installed on the return pipe to the heat pump labelled 'Water inlet'. Refer to "Safety Instructions Before Start-up" on page I-55.

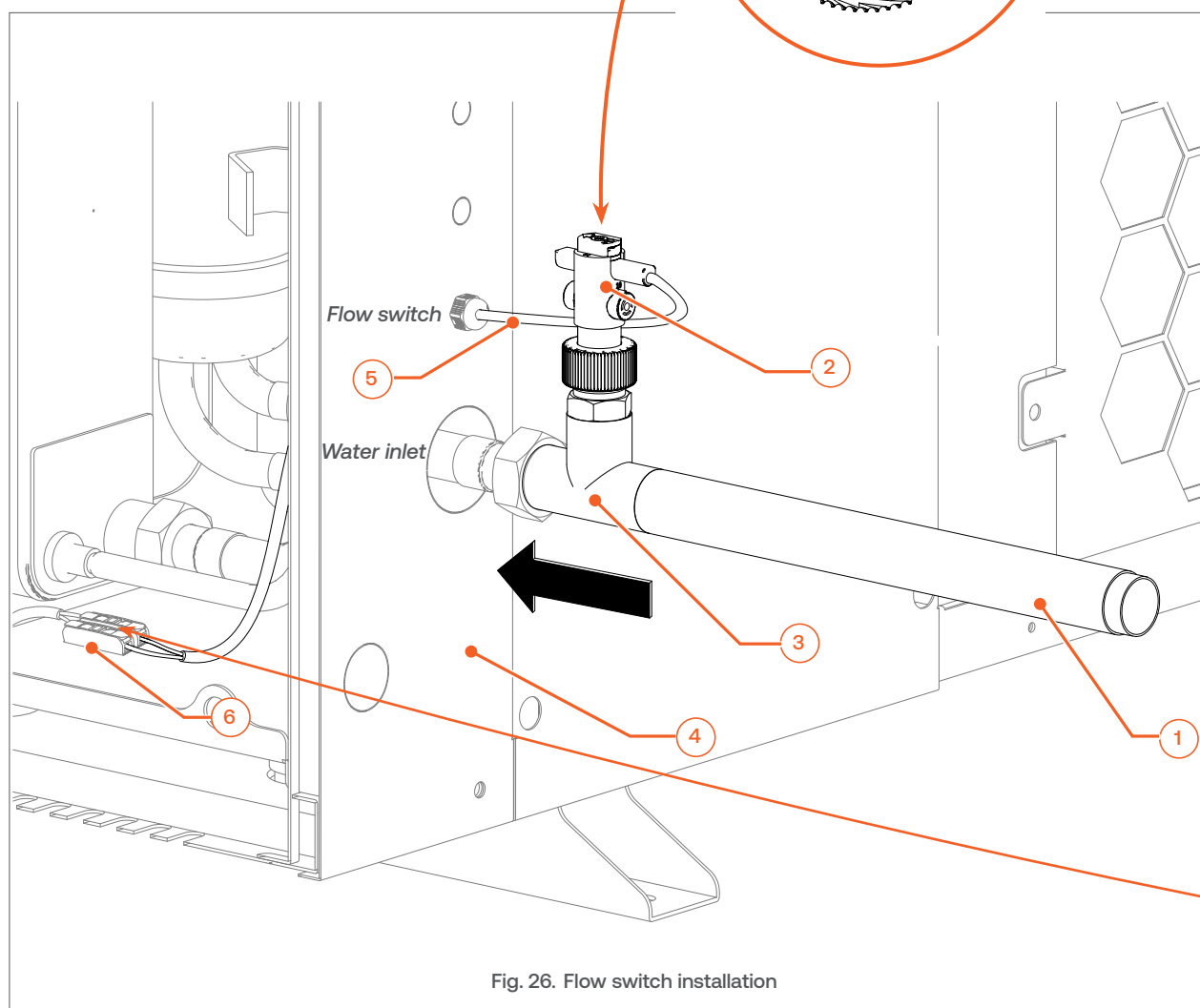
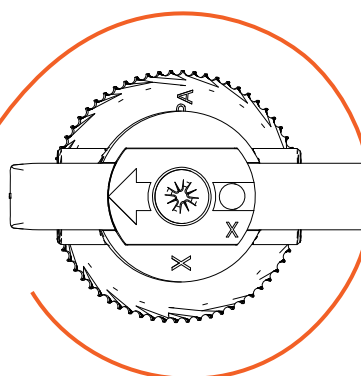


Fig. 26. Flow switch installation

Procedure:

1. Ensure a straight return pipe section (1) upstream of the flow switch (2), with a minimum length of the equivalent of 5 times the internal pipe diameter. Due to this requirement the flow switch is supplied separately. This allows to install i.e. elbow on the heat pump return pipe (but only downstream of the flow switch) if required by installation place.



► **Avoid bends, other fittings, valves, drains, or wider sections of pipe, and any other features within a distance of 5 times the internal pipe diameter upstream of the flow switch, that might cause obvious fluctuations in flow rate through this area**

2. Seal the thread with a suitable sealing material (e. g. hemp or Teflon tape).
3. Screw the set of flow switch and tee connector (3) to the pipeline. Make sure that the arrow indicating flow direction on the top of the flow switch (2) is pointing towards the heat pump (4).
4. Connect the flow switch wires (5) to the dedicated connector (6) mounted to the heat pump (4) through the cable gland labelled "FLOW SWITCH". Lift the orange clamp (7) upwards and insert each wire of the flow switch (2) into

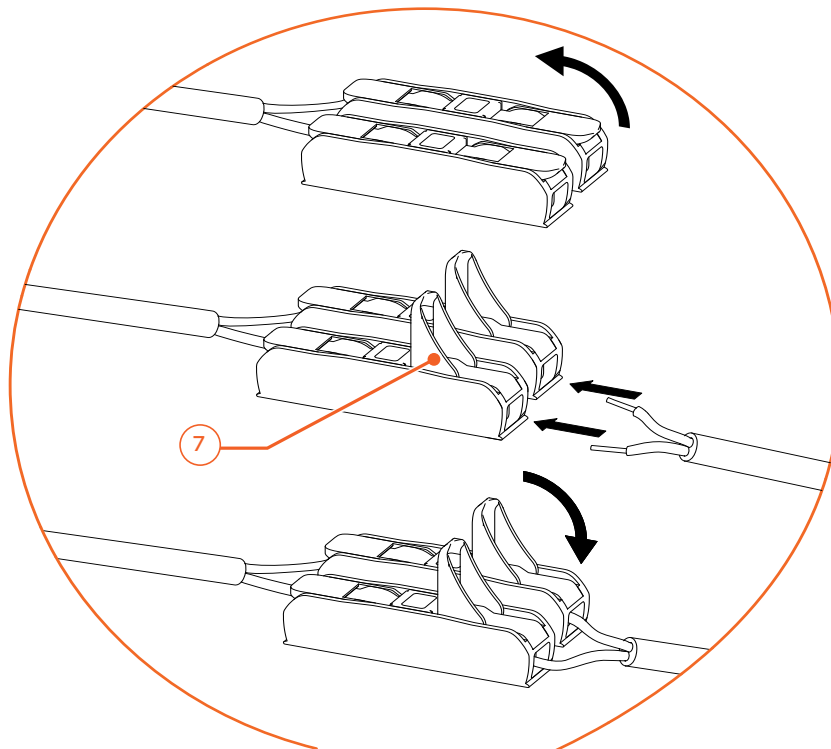
a dedicated terminal of the connector (6). The order of connection does not matter. Make sure that appropriate length of insulation is removed from the part of the wire that will be connected as required by the slot in the connector (6).

5. Close the clamps (7) to secure the wires. Make a visual confirmation of the stability of the connection.

Follow-on Task(s):

Start the appliance as required. Refer to **"Start-up and Commissioning"** on page I-58.

Check that there are no leaks. If required, seal the pipeline and tee connections.



Start-up and Commissioning



- All initial checks have been carried out. Refer to **“Installing and Preparing the Unit”** on page 2.



Procedure:

1. Make sure that shut-off valves on the refrigerant side (if present) are open in the appliance before starting up.
2. Energise the unit through the dedicated fuse(s) on the electric box.
3. Make sure that the Emergency switch is in ON position.



- **Never use the emergency switch to turn the unit on and off; it should only be used in emergencies to disconnect the unit from the power supply when it 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.**
- **It is important to let the heat pump reach the setpoint and then start up the system terminals. In the case of a single hydraulic circuit in which only one water pump circulates water, keep all terminals closed or switched off until the heat pump switches off due to reaching the setpoint. Then leave the terminals in automatic mode.**
- **In the case of separation of the primary circuit (heat pump to water tank) and the secondary circuit (water tank to terminals), keep both the secondary circuit pump and the terminals switched off.**
- **Switch on the heat pump until the setpoint is reached, then set the operation of the secondary circuit pump to automatic, and finally set the consumers to automatic.**

4. Press the key corresponding to the Heating  or Cooling  mode located on the control panel. The corresponding icon will appear on the screen. Refer to **“Symbols and functions”** on page 17 for more information on the available modes.
5. Perform the setup of the system as required. Refer to **“Setpoints”** on page I-69.
6. Check the operation of the compressors and fans by measuring the electric consumption of each component.
7. Open rear panel to access the pressure and temperature gauges of the high-pressure and low-pressure service ports. Refer to **“Opening and Closing panels”** on page I-43.
8. A few minutes after start up, check that the equivalent temperature of the refrigerant gas, measured at the pressure inside the finned coil with fans running at full speed, differs from the outside air temperature of about 7-10 °C.
9. Verify that the saturated temperature of the refrigerant gas, measured at the pressure in the plate heat exchanger, differs from heat exchanger water outlet temperature about 3-5 °C.
10. After several hours of operation, check that the sight glass has a green colour core. If the core is yellow, moisture is present in the circuit.
11. Regularly clean the water filter.

Follow-on Task(s):

Close panel, refer to **“Opening and Closing panels”** on page I-43.



When operating at full power, check that the current consumption is within the limits given on the nameplate. In case of abnormal consumption, turn off the fan and contact our support department.

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.
- ▶ Make sure to perform all obligations:
 - ▶ Keep records of the equipment, specified in Logbook.
 - ▶ Carry out the correct installation, maintenance and repair of equipment.
 - ▶ Perform regular leakage control.
 - ▶ Perform refrigerant recovery and disposal management.
- ▶ 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, see “Health and Safety – Hazard and prevention”. The antistatic clothes and charge-dissipating wristbands should be used.
- ▶ When working on the unit, smoking and the presence of any other open flame or ignition source is strictly forbidden.
- ▶ During work on the refrigerant circuit, ensure well-ventilated area; the atmosphere must be monitored using a suitable gas detector.
- ▶ Tools and measuring devices that may come into contact with the refrigerant or its mixture with air must not cause ignition.
- ▶ Be aware that a cell phone, E-cigarettes or similar electronic devices could be a source of ignition.



- ▶ Before performing any maintenance operation, shut down the unit using the appliance on/off switch 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.
- ▶ Replace any gaskets or seals present on the removed components before reinstallation, unless otherwise specified in the procedures.
- ▶ Shut-off valves in the refrigerant circuit need to be closed for maintenance, make sure to tag the taps in order to indicate that they are closed. All tagged manual shut-off valves must then be reopened before start-up of the unit.
- ▶ To ensure the performance, durability and reliability of the unit, it is recommended that the end-user perform the periodic checks. Please refer to “Safety Instructions for the User” mentioned in the Safety section for the user, at the beginning of this manual.
- ▶ The minimum pressure of the primary circuit is between 1,5 and 3 bar when cold.
- ▶ If the water circuit needs to be topped up, allow the unit to cool down and only add small quantities of water at a time. Adding a large quantity of cold water in a hot appliance can damage the appliance permanently.
- ▶ If the unit remains unused during the winter period, the water contained in the pipes may freeze and cause serious damage. Fully drain the water from the pipes, checking that all parts of the circuit are empty including any internal or external traps and siphons.
- ▶ If leak detection instruments are installed on the system, they must be inspected at least once a year, to ensure their correct operation.



The inspection and maintenance tasks are detailed in tables in this section. Perform all recommended tasks and complete the logbook available from your AIC technical representative with all the required information.

MAINTENANCE

Maintenance Requirements



To perform maintenance, connect to the **aicON** application and fill in all the relevant information. Refer to the back cover of the manual for easy access. Please contact your AIC representative for more information about this app.

Safety requirements:



Caution :



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.	X	X	X
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.			
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 tightness check must be carried out on the entire system.	X	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). Refer to: “Checking tightness of the refrigerant circuit” on page I-66.	X		X



If a detected defect endangers the reliable operation of the unit, the unit cannot be restarted until it is repaired.

Specific Maintenance Tasks

Tasks		Months*		Years
		1*	6	1
Electrical System				
Check that the unit works properly and that there are no active warnings		X		X
Visually inspect the unit		X		X
Check noise and vibration level of the unit				X
Check operation of safety features and interlocks				X
Check the unit's performance				X
Check the current draws of the different parts (compressors, fans, pumps, etc.)				X
Check tightness of high voltage connections				X
Visually check of the insulating coating of power cables				X
Clean the electrical and electronic components of any dust				X
Check the functioning and settings of probes and transducers				X
Check the correct positioning of 3-way motors on 3 way valves, if present				X

Safety requirements:    

Tasks		Months		Years
		1*	6	1
Condensing coils and fans				
Visually inspect the coil		X		X
Clean finned coils			X	X
Check the water flow and/or any leaks		X		X
(Check that the flow switch is working properly (refer to Troubleshooting))				X
Clean the water filter on the water line			X	
Check the supply voltage of the fans			X	X
Check the fans' electrical connections				X
Check the 3-way valve operation (if present)				X
Check the colour of moisture indicator on refrigerant liquid line				X
Check the refrigerant leak. Repair if required				X
Check the liquid solenoid coils (refer to Troubleshooting)				X

* 30 days after start-up

MAINTENANCE

Safety requirements:



Tasks	Months		Years
	1*	6	1
Compressors			
Visually inspect the compressors			X
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		X
Check that the crankcase heaters are powered and working properly			X
Check the conditions of the compressors' power cables and their tightness in the clamps			X
Check the electrical absorption of individual compressors.	X		X
Check the tightness of the nuts securing the compressor feet.			X
Check the integrity of individual compressor electrical cables.			X

* 30 days after start-up

Safety requirements:



Tasks	Months	Years	
	6	1	5
Other control activities			
Rust on the chassis		X	
Insulation integrity		X	
Tightening collar screws		X	
Presence of anomalous vibrations		X	
Presence of alarms on controller web server (or from supervision)		X	
General check of operating values on Web server		X	
Operation of cooling fan in electrical cabinet		X	
Replace the fan filter in electrical cabinet		X	
Cleaning of a unit area		X	

Safety requirements for repairing of the refrigerant circuit



- ▶ The heat pump contains propane - a highly flammable refrigerant. Special care should be taken during handling, installation, service, cleaning and scrapping to reduce the risk of leakage and explosion.
- ▶ This procedure can only be performed by qualified professionals.
- ▶ Works must be carried out outdoors or in a ventilated area.
- ▶ Ventilation must be provided around any refrigerant outlet which should be routed outdoors.
- ▶ Always use a suitable refrigerant detector prior to and during works, otherwise a possible flammable atmosphere can occur.
- ▶ If work requiring high temperatures is to be carried out on the heat pump, a powder or carbon dioxide fire extinguisher should be on hand.
- ▶ All potential ignition sources, including smoking, should be kept at a safe distance from the service work area where combustible refrigerant can leak out. Inspect the area around the equipment before carrying out work to ensure there is no risk of ignition.

Safety requirements:



Caution:



Conditions:



Procedure:

When brazing is required, the following steps should be taken:

1. Switch off the general power supply to the electrical cabinet. Make sure that the system is continually grounded.
2. Make sure that the capacitors are discharged. Discharging must be done safely, to prevent the risk of sparking.

3. Discharge the refrigerant circuit. Refer to "Discharging the refrigerant circuit" on page I-65.
4. Purge the empty refrigerant circuit with nitrogen gas for 5 min.
5. Parts to be replaced should be removed by cutting, not by flame. Remove parts to be replaced by cutting, not by flame.
6. Purge the brazing point with nitrogen gas during the brazing procedure.
7. Carry out a leak test before charging with refrigerant.
8. Reassemble sealed enclosures carefully. If seals are worn, replace them.
9. Check the safety of the equipment before putting it into service.

Follow on task(s): None



- ▶ In addition, the following measures should be ensured:
- ▶ Hoses and lines must be as short as possible to minimize the volume of enclosed refrigerant. Hoses must be in good condition and equipped with leak-proof quick couplings.
- ▶ Use fully functioning and calibrated scales.
- ▶ Refrigerant tanks must be stored in a suitable position in accordance with the instructions.
- ▶ Ensure that the cooling system is grounded before filling the system with refrigerant.
- ▶ Take special care to not overfill the refrigeration system (max. 80% of the liquid volume). Perform a system leak test after filling but before using the system.
- ▶ Before using the recovery station, check that it is working properly and has been properly maintained. Related electrical components must be insulated, to prevent ignition in the event of refrigerant leak.
- ▶ Do not exceed the containers maximum permitted working pressure.

MAINTENANCE

Draining oil from compressors



- ▶ **Make sure that the power supply to the unit is deactivated.**



- ▶ When draining oil from compressor or collectors by means of a drain plug, it is required to reduce the pressure in the compressor (or collector) to atmospheric pressure before removing the plug.
- ▶ Avoid oil replenishment with products that are different from that specified and that are pre-loaded into the compressor
- ▶ It is recommended that oil is drained regularly in order to avoid interference with liquid level control, which could lead to compressor or pump damage.
- ▶ Oil shall not be discharged onto the ground or into sewers, waterways, groundwater or seawater.

Safety requirements:



Caution :



Conditions:



Follow on tasks:

Dispose the oil. **Refer to** “Disposal of the Product at the End of Service Life” on page G-35.



It is recommended that oil is drained regularly in order to avoid interference with liquid level control, which could lead to compressor or pump damage.

Before starting the procedure, prepare your connections before removing the plugs from the compressor or dryer being replaced. This will reduce the compressor opening time and minimize the risk of moisture absorption by the refrigeration oil.

Discharging of refrigerant



- Tools and measuring devices that may come into contact with the refrigerant or its mixture with air must not cause ignition.
- Before starting the procedure, inform all persons nearby of the hazardous nature of the work. Instruct them according to the "**Health and Safety - Hazard and Prevention**" on page 9.
- In the event of a gas leak in the refrigerant system, even if it is only a partial leak, do not top it up. The entire system must be first emptied, the leak repaired and a new refrigerant charged into the circuit.

Safety requirements:



Caution :



Conditions:

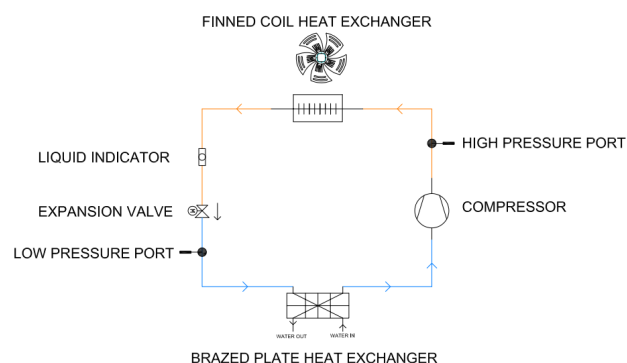


Tools and material : Vacuum pump

Procedure:

1. Connect the manifold gauge set to the low and the high pressure ports of the heat pump. Make sure the valves on the manifold set remain closed.
2. Connect the vacuum pump and the inlet of the recovery station to the remaining manifold set inlets, using hoses.
3. Connect the outlet of the recovery station to the refrigerant tank equipped with digital scale, using a hose. With the refrigerant tank, and the heat pump connectors closed, open the manifold gauge inlet up to refrigerant tank.
4. Turn on the vacuum pump allowing air and moisture to leave hoses and the equipment.
5. After 15 minutes turn the vacuum pump off and close the vacuum pump hose using valve on the manifold set.
6. Open the refrigerant tank and heat pump high and low ports.
7. Turn the recovery station on and wait until its operation is finished. It should turn off automatically after discharging is complete done. It may be necessary to wait a few minutes and repeat this step, as any remaining of refrigerant may dissolve in the oil.
8. Monitor the digital scale to monitor the charge being drawn from the heat pump and only stop recovery when there is no change in the value during the operation of the recovery station.
9. Once recovery is complete turn the knob on the recovery station to "purge" and operate it to ensure the recovery station is empty.
10. Close the refrigerant tank and safely disconnect the charging equipment from the unit.

LEGEND	
—	LOW PRESSURE LINE (LP)
—	HIGH PRESSURE LINE (HP)



Follow-on Task(s):

1. Perform the procedure of checking the tightness of the refrigerant circuit. Refer to "**Checking tightness of the refrigerant circuit**" on page I-66.
2. Refer to the "**Disposal of the Product at the End of Service Life**" on page G-35.

Checking tightness of the refrigerant circuit



Before starting checking tightness, perform discharging refrigerant procedure. Refer to “Discharging the Refrigerant” on page I-65.

Safety requirements:



Caution :



Conditions:



Tools and material : -

Nitrogen gas tank with pressure reduction valve and pressure gauge

Procedure:

1. Charge the system with nitrogen gas, either at the high or low pressure port until 2 MPa pressure is reached.
2. Observe if the pressure gauge indicates a pressure drop.
3. Check all screwed connections using aerosol foam by spraying the joints. The gas leakage will be visible in the form of growing bubbles.
4. After checking the system for nitrogen gas leaks, slowly evacuate the gas from the system.

Follow-on Task(s):

If charging the refrigerant is required, refer to “Charging the Refrigerant” on page I-67.



- ▶ If repair is required: perform repairs on the refrigerant circuit. Use a tube cutter to cut out the parts to be replaced. NEVER USE A TORCH as R290 refrigerant may still be present in the system.
- ▶ Repeat the checking tightness of the refrigerant circuit procedure once again
- ▶ Perform charging refrigerant procedure. Refer to “Charging refrigerant” on page I-67.

Charging of refrigerant

Safety requirements:



Caution :



Conditions:



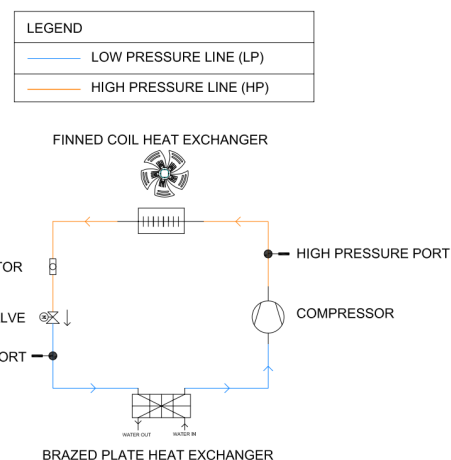
- **Make sure a leak test with nitrogen gas has been performed before charging and the refrigerant system is tight. Otherwise, refer to “Checking tightness of the refrigerant circuit” on page I-65.**

Tools and material : -

- Manifold gauge set
- 5 refrigerant hoses
- R290 refrigerant tank
- Vacuum pump
- Recovery station

Procedure:

1. Connect the manifold gauge set to the low and high pressure ports of the heat pump. Make sure the valves on the manifold set remain closed.
2. Connect the vacuum pump and the inlet of the recovery station to the remaining manifold set inlets, using hoses.
3. Connect the inlet of the recovery station to the refrigerant tank equipped with digital scale, using a hose.
4. With the refrigerant tank closed, open the manifold gauge inlets.
5. Turn on the vacuum pump allowing air and moisture to leave hoses and the equipment.
6. After 30 minutes turn the vacuum pump off and close the vacuum pump using valve on the manifold set.
7. Check the nameplate on the heat pump and charge the refrigerant strictly according to the labelled amount.
8. Open the refrigerant tank.
9. Turn the recovery station on and monitor the digital scale until the system is filled with desired charge.
10. Once the system is fully charged, close the refrigerant tank. Then close off the heat pump low and high pressure ports and disconnect manifold gauge set from the unit.



Follow-on Task(s): None

MAINTENANCE

Decommissioning



The decommissioning of the unit and its components must be carried out by a qualified professional. The refrigerant charge shall be removed before decommissioning. Refer to “Discharging Refrigerant” on page I-65.

Safety requirements:



Caution :



Conditions:



Tools and material:

- ▶ Nitrogen gas tank,
- ▶ Label with notice “The Refrigerant R290 removed”.

Procedure:

1. Perform the procedure ‘Discharging of refrigerant’ from page I-65.
2. Fill with nitrogen up to atmospheric pressure.
3. Place a label on the equipment that the refrigerant R290 is removed.

Follow-on Task(s): 1

Dispose the product. Refer to “Disposal of the Product at the End of Service Life” on page G-35.

Operation Modes

Cooling mode

When the key  is pressed, the corresponding icon appears on the display; the cooling mode is activated.

If requested, the compressor safety delay countdown starts and the compressor icon flashes.

The water pump will be activated after few seconds, and then, once the compressor countdown has finished, the compressor starts and the icon remains on.

The display shows the user water outlet temperature and domestic hot water outlet temperature.

Heating mode

When the key  is depressed, the corresponding icon appears on the display; the heating mode is activated.

If requested, the compressor safety delay countdown starts and the compressor icon flashes.

The water pump will be activated after few seconds and then, once the compressor countdown has finished, the compressor starts and the icon remains on.

The display shows the user water outlet temperature and domestic hot water outlet temperature.

Domestic hot water mode ()

At the first start up, the unit controller checks the domestic hot water inlet temperature measured by the sensor BTS (this has priority over the other parameters) and, if the measured temperature is lower than the domestic hot water setpoint, it will activate the domestic hot water mode automatically.

If the unit is required to operate in a heating mode, and the domestic hot water temperature is higher than the setpoint (there is no requirement for domestic hot water), the controller will activate the unit in heating mode.

If the unit is required to operate in cooling and domestic hot water mode, the controller will activate both functions at the same time. If domestic hot water is not required, the controller will activate cooling mode only.

In stand-by mode, the controller gives the possibility to:

- display the set values
- manage alarms, their display and reports

Reset values

Device		Set-point	Differ- ential	Reset
Heating mode	°C	70	4	-----
Domestic hot water mode	°C	60	5	-----
Cooling mode	°C	7	4	-----
Anti-freeze thermostat	°C	4	3	Automatic
High pressure switch	Bar	34,5	12	Automatic x3 times (then manual)
Low pressure switch	Bar	0,1	0,9	

Setpoints

Function		Adjustment limit	Default value
Heating set-point	°C	25-70	70
Domestic hot water set-point	°C	25-70	60
Cooling set-point	°C	6-27	7
Password		(Contact AIC)	



All set points referred to the delivered temperature (unit outlet). The unit will be stopped when the setpoint is reached and will start to partition at the temperature equal to the setpoint + differential (chiller mode) and setpoint - differential (heating mode).

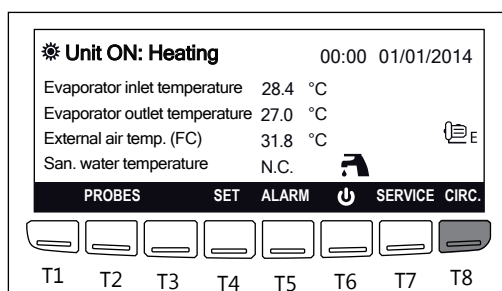
ADDITIONAL INFORMATION FOR THE INSTALLER

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-17.
- Basic operations that can be performed at the end user level are described in “Operating the Controller - End User Level” on page U-36.
- In some cases, a password is required to access setup or reset functions. Please contact your AIC representative for more information.

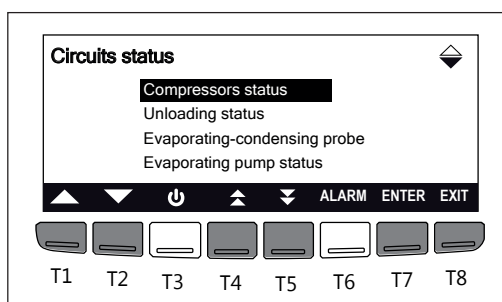
Reading System Data - CIRC Function



Depress:

T8 (CIRC) to access data related to the circuits:

- Compressor status
- Unloading status
- Evaporating-condensing probe
- Evaporating Pump status
- Condenser fan



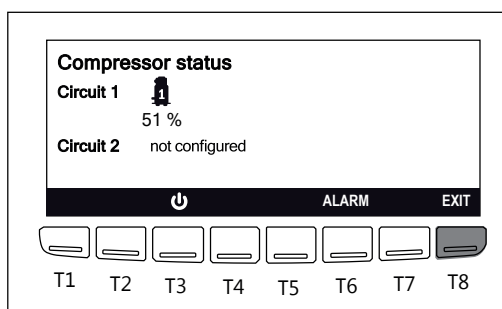
Depress:

T4 (▲) / T5 (▼) to scroll through the pages

T1 (▲) / T2 (▼) to scroll through the displayed lines.

T7 (ENTER) to confirm the line selection and access the line-related screen.

T8 (EXIT) to exit the menu go back to the home screen.



Only the Compressor Status screen is shown here as an example, but each line has its own dedicated screen.

Compressor Status:

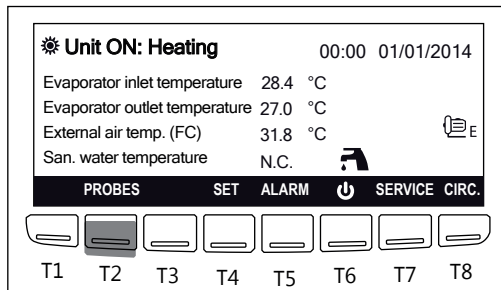
- A black icon indicates an active status
- A white icon indicates an inactive status (standby)

If the compressors are used in part-load (e.g. screw compressors), an additional icon is displayed to show the level of step control.

If the compressors are of the On/Off type (Scroll) no icon is displayed next to the compressor.

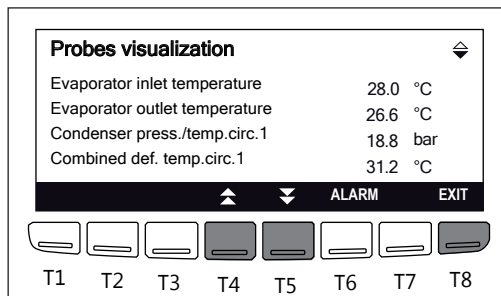
T8 (EXIT) to exit the menu go back to the previous screen

Reading System Data - PROBES Function



Depress:

T2 (PROBES) to read the data collected through the sensors installed in the system.

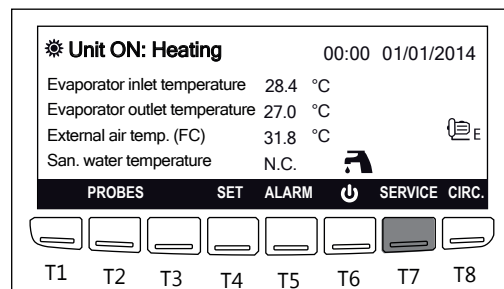


Depress:

T4 (▲) / T5 (▼) to scroll through the pages

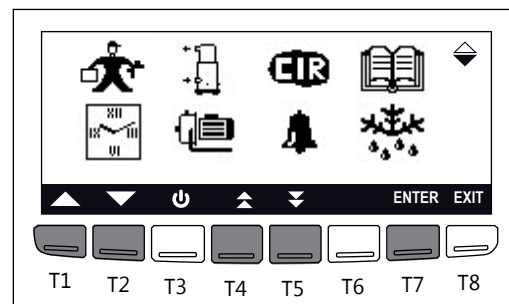
T8 (EXIT) to exit the menu and return to the home screen

Accessing the Service Functions



Depress:

T7 (SERVICE) to access the **Service** screen

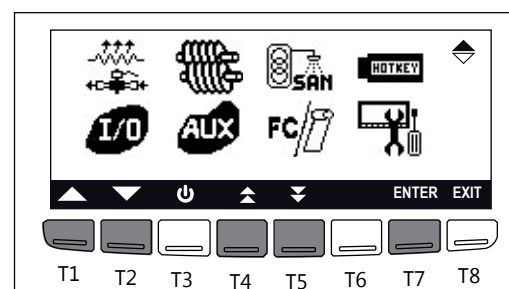


Depress:

T1 (▲) / T2 (▼) to scroll through the displayed icons.

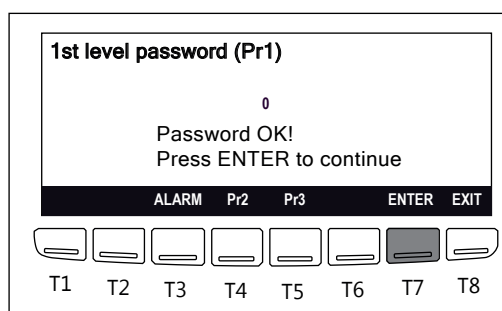
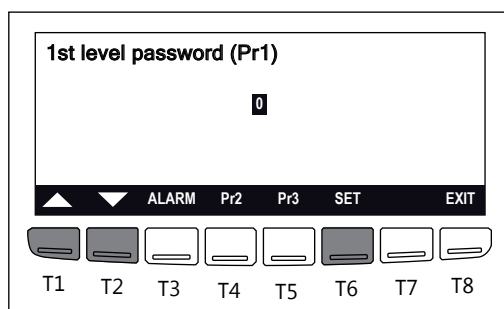
T7 (ENTER) to confirm the icon selection and access the related screen.

T4 (▲) / T5 (▼) to toggle between pages 1 and 2



ADDITIONAL INFORMATION FOR THE INSTALLER

Setting the Service Parameters ()



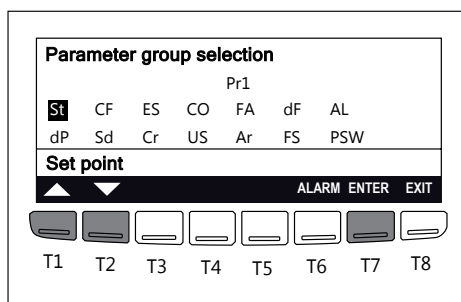
Depress:

T1 () and T6 () simultaneously to set password to “1”.

T6 () to confirm

T7 () to access the **parameter selection** screen.

Service Parameters – Set Points



Depress:

T1 () / T2 () to scroll through the functions, and select “St”

T7 () to access the **Set Point** screen and access the following functions:

- Summer set point (St01)
- Winter set point (St04)
- Summer regulation band (St07)
- Winter regulation band (St08)

T1 () / T2 () to scroll through the functions

T7 () to enable value change.

T1 () / T2 () to perform the value adjustment.

T7 () to validate the change

T8 () to exit the menu and return to the previous screen

Parameter groups

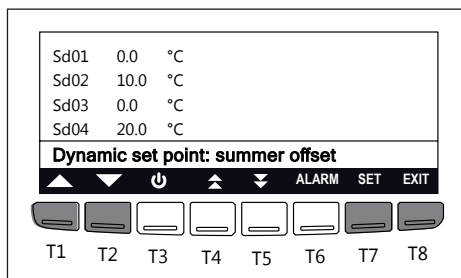
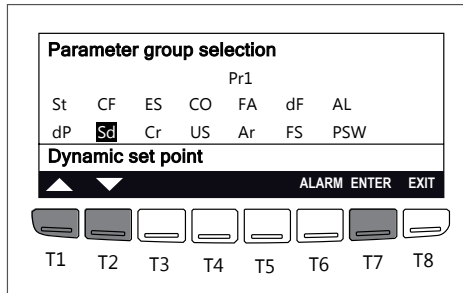
Label	Meaning
ST	Display temperature control parameters
DP	Display variables to be shown on the keyboard
CF	Display configuration parameters
SP	Display parameters for machine set up
Sd	Display dynamic set-point parameters
ES	Display energy saving and automatic timed switch-on/off parameters
AH	Display auxiliary heating parameters
CO	Display compressor parameters
SL	Display stepless compressor parameters
PA	Display evaporator/condenser water pump parameters
Pd	Display pump down function parameters
Un	Display unloading function parameters
FA	Display ventilation parameters
Ar	Display anti-freeze heaters parameters
dF	Display defrost parameters
rC	Display heat recovery parameters
FS	Display production of domestic hot water parameters
FC	Display free-cooling function parameters
US	Display auxiliary output parameters
AL	Display alarm parameters
Et	Display parameters for the management of the electronic expansion valve
IO	Display inputs/outputs configuration parameters
CA	Display analog input calibration parameters
RA	Display analog input range parameters

According to user level, different amount of parameters are visible in the parameters programming screen.

- SERVICE menu with 1st level, enters to see parameters in Level 1(Pr1).
- SERVICE menu with 2nd level, enters to see parameters in Level 1(Pr1) and Level 2(Pr2).
- SERVICE menu with 3rd level, enters to see parameters in Level 1(Pr1), Level 2(Pr2) and Level 3(Pr3).

ADDITIONAL INFORMATION FOR THE INSTALLER

Service Parameters - Dynamic Set Points



Depress:

T1 (▲) / T2 (▼) to scroll through the functions, and select “Sd”

T7 (ENTER) to access the **Dynamic Set Point** screen and access the following functions:

- › Dynamic set point: summer offset (Sd01)
- › Dynamic set point: winter offset (Sd02)
- › Dynamic set point: summer outside temp (Sd03)
- › Dynamic set point: winter outside temp (Sd04)
- › Dynamic set point: summer differential temp (Sd05)
- › Dynamic set point: winter differential temp (Sd06)

T1 (▲) / T2 (▼) to scroll through the functions

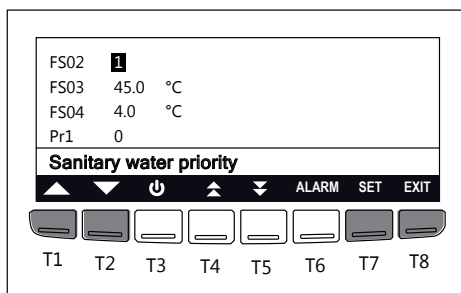
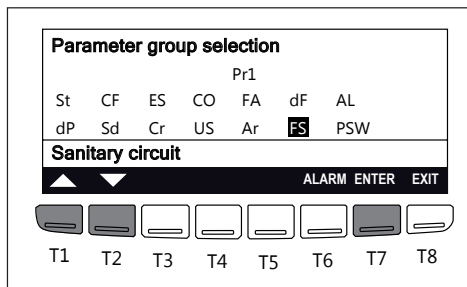
T7 (SET) to enable the value change.

T1 (▲) / T2 (▼) to perform the value adjustment.

T7 (SET) to validate the change

T8 (EXIT) to exit the menu and return to the previous screen

Service Parameters - Sanitary Circuit



Depress:

T1 (▲) / T2 (▼) to scroll through the functions, and select “FS”

T7 (ENTER) to access the **Sanitary Circuit** screen and access the following functions:

- › Sanitary water priority (FS02)
- › Sanitary water set point (FS03)
- › Sanitary water proportional band (FS04)

T1 (▲) / T2 (▼) to scroll through the functions

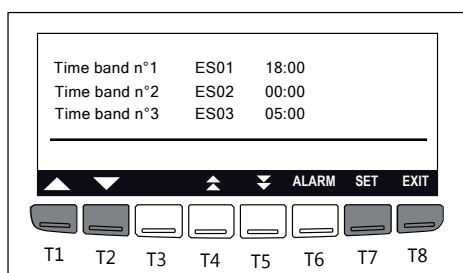
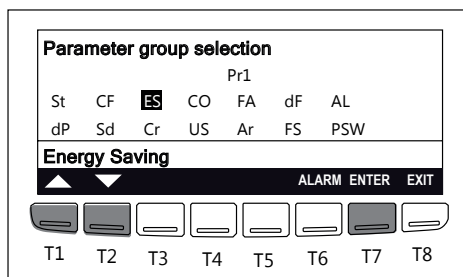
T7 (SET) to enable the value change.

T1 (▲) / T2 (▼) to perform the value adjustment.

T7 (SET) to validate the change

T8 (EXIT) to exit the menu and return to the previous screen

Service Parameters - Energy Saving mode



Depress:

T1 (▲) / T2 (▼) to scroll through the functions, and select “ES”

T7 (ENTER) to access the **Energy Saving** screen.

This function allows to set the system in two different operating modes:

► **Automatic On-Off** - the unit goes On/Off according to set times.

► **Energy Saving** - two different set points can be set, one for the day and one for the night.

T1 (▲) / T2 (▼) to scroll through the functions

T7 (SET) to enable the value change.

T1 (▲) / T2 (▼) to perform the value adjustment.

T7 (SET) to validate the change

T8 (EXIT) to exit the menu and return to the previous screen



Also refer to “Setting the Time and Date” on page U-38 for Time band parameter reading.

Up to three time bands can be set.

Parameter code	Meaning	min	max	um	Resolution
ES1	Start of working time band 1 (0-24)	0	24.00	Hr	10 min
ES2	End of working time band 1 (0-24)	0	24.00	Hr	10 min
ES3	Start of working time band 2 (0-24)	0	24.00	Hr	10 min
ES4	End of working time band 2 (0-24)	0	24.00	Hr	10 min
ES5	Start of working time band 3 (0-24)	0	24.00	Hr	10 min
ES6	End of working time band 3 (0-24)	0	24.00	Hr	10 min
Monday with energy saving time band 0 = None 1 = Time Band 1 2 = Time Band 2 3 = Time Bands 1 and 2 4 = Time Band 3 5 = Time Bands 1 and 3 6 = Time Bands 2 and 3 7 = All time bands					
ES7		0	7		
ES8	Tuesday with energy saving time band	0	7		
ES9	Wednesday with energy saving time band	0	7		
ES10	Thursday with energy saving time band	0	7		
ES11	Friday with energy saving time band	0	7		
ES12	Saturday with energy saving time band	0	7		

ADDITIONAL INFORMATION FOR THE INSTALLER

<i>Parameter code</i>	<i>Meaning</i>	<i>min</i>	<i>max</i>	<i>um</i>	<i>Resolution</i>
ES13	Sunday with energy saving time band	0	7		
ES14	Increase energy saving setting in chiller mode	-50.0	110	°C	Dec
		-58	230	°F	int
ES15	Energy saving differential in chiller mode	0.1	25.0	°C	Dec
		1	45	°F	int
ES16	Increased energy saving set in heat pump operation	-50.0	110	°C	Dec
		-58	230	°F	int
ES17	Energy saving setting increase in heat pump mode	0.1	25.0	°C	Dec
		1	45	°F	int
ES18	Monday automatic shutdown time band	0	7		
ES19	Tuesday automatic shutdown time band	0	7		
ES20	Wednesday automatic shutdown time band	0	7		
ES21	Thursday automatic shutdown time band	0	7		
ES22	Friday automatic shutdown time band	0	7		
ES23	Saturday automatic shutdown time band	0	7		
ES24	Sunday automatic shutdown time band	0	7		
ES25	Max. unit working time in OFF rom RTC if forced ON via a key	0	250	Min	10 Min

Clock/Time Bands ()



Also refer to “Setting the Time and Date” on page U-38.

Clock / time bands configuration

Clock setting 10 : 07
Date setting 05 / 7 / 14
Day of the week Tuesday

▲ ▼ ▲ ▼ ALARM SET EXIT

T1 T2 T3 T4 T5 T6 T7 T8

Clock / time bands configuration

	Start	Stop
Time band n°1	18:00	00:00
Time band n°2	05:00	19:00
Time band n°3	00:00	08:00

▲ ▼ ALARM EXIT

T1 T2 T3 T4 T5 T6 T7 T8

Depress:

T4 (▲) / T5 (▼) to read the info about the Energy saving, ON/OFF scheduling and time bands on other screens. Any modification is subjected to an access password. Please contact your AIC representative

T8 (EXIT) to exit the menu

Compressor maintenance ()

Compressor maintenance

Circuit 1
Circuit 2

▲ ▼ ⏻ ALARM ENTER EXIT

T1 T2 T3 T4 T5 T6 T7 T8

Circuit 1

	Status	Hour	Start-up	Reset
Comp 1	enabled	0	2	RST

▲ ▼ ⏻ ALARM ENB/DIS EXIT

T1 T2 T3 T4 T5 T6 T7 T8

Depress:

T1 (▲) / T2 (▼) to scroll through the lines

T7 (ENTER) to access the **Circuit status** screen.



The disabling function can only be used by Service personnel

T8 (EXIT) to exit the menu and return to the previous screen

ADDITIONAL INFORMATION FOR THE INSTALLER

Water Pump ()

Water pumps	Hour	Reset
Evaporator water pump	19	RST
Sanitary water pump	0	

Depress:

T1 () / T2 () to scroll through the lines and display the water pumps working hours

T7 () to reset the counter.



The Reset function can only be used by Service personnel

T8 () to exit the menu and return to the previous screen

Circuit maintenance ()

Circuits	
Circuit 1	enabled
Circuit 2	not configured

Depress:

T1 () / T2 () to scroll through the lines and display the circuits working hours

T7 () to reset the counter.



The Enable/Disable function can only be used by Service personnel

T8 () to exit the menu and return to the previous screen

Alarms ()

Alarms	
b1HP	Active
Clock alarm	

Depress:

T1 () / T2 () to scroll through the lines

T7 () to reset the alarm.



The Reset All function can only be used by Service personnel. Also refer to “Resetting an Alarm - ALARM Function” on page U-37.

T8 () to exit the menu and return to the previous screen



If an alarm buzzer is sounding, it can be stopped by pressing and releasing any of the keys.

Alarm log ()

Alarm log	
b1HP	001
High pressure circuit 1	
b1AC	002
Antifreeze circuit 1 in summer mode	

Depress:

T4 () / T5 () to scroll through the pages of the log (up to 99 errors in the log)

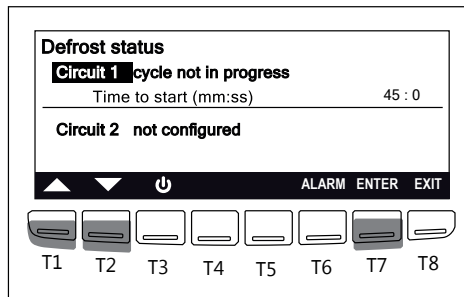
T7 () to reset the alarm.



The Reset All function can only be used by Service personnel. Also refer to “Resetting an Alarm - ALARM Function” on page U-37.

T8 () to exit the menu and return to the previous screen

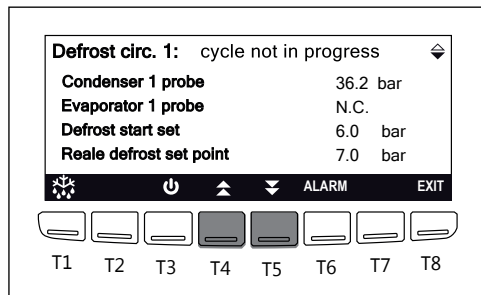
Defrost



Depress:

T1 () / T2 () to scroll through the lines

T7 () to access the **Defrost status** screen of the selected circuit.

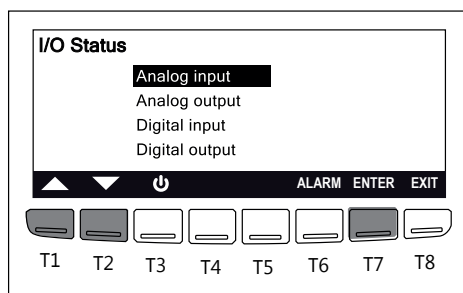


Depress:

T4 () / T5 () to scroll through the pages and read the parameters

T8 () to exit the menu and return to the home screen

Input/Output Status ()



Depress:

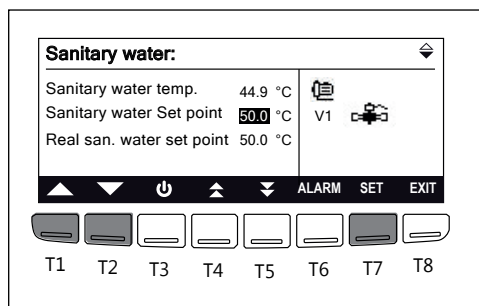
T1 () / T2 () to scroll through the lines

T7 () to access the screen of the selected line and read the parameters:

- › Probes status
- › Analog input and output
- › Digital input and output

ADDITIONAL INFORMATION FOR THE INSTALLER

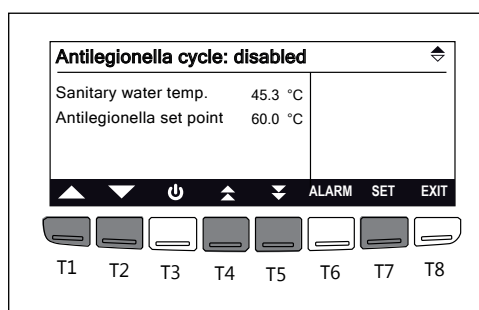
Sanitary Water ()



Depress:

T1 (▲) / T2 (▼) to scroll through the lines

T7 (ENTER) to access the **Sanitary water** regulation parameters.



Depress:

T7 (SET) to enable the value change.

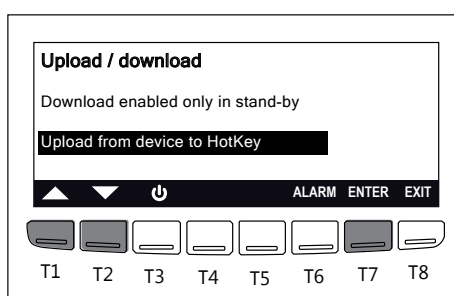
T1 (▲) / T2 (▼) to perform the value adjustment.

T7 (SET) to validate the change

T4 (▲) / T5 (▼) to scroll through the pages and read the parameters

T8 (EXIT) to exit the menu and return to the home screen

Upload/Download ()



Depress:

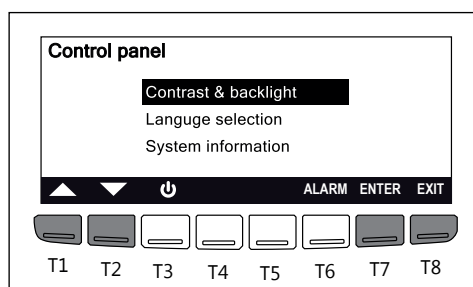
T1 (▲) / T2 (▼) to scroll through the lines

T7 (ENTER) to activate the function.



The Upload/Download function can only be used by Service personnel.

Control Panel ()



Depress:

T1 (▲) / T2 (▼) to scroll through the lines

T7 (ENTER) to activate the function.



The Control Panel functions are already described in the end-user section, in "Screen and Language Setup" on page U-39.

Troubleshooting

Machine alarms

Code	Alarm Description	Cause	Solution
ACF1 ... ACF19	Configuration alarm	Configuration of parameters is wrong	Change parameters to correct values, contact AIC representative if necessary.
AEFL	Evaporator flow alarm	No water flow in evaporator circuit	Look for clogs in circuit, check water flow sensor, check water pump performance.
AEht	High water temperature inlet evaporator	Water temp in water circuit too high	Check setpoint and parameters, waterflow, and other devices in water circuit. Check water temp sensor.
AEUn	Unloading signalling from high temp. of evaporator	Unload signalling from evaporator	Check setpoint and parameters, waterflow, and other devices in water circuit. Check water temp sensor.
APS	Phase sequence alarm	Phase order detector tripped	Check Phase order and phase order circuit.
AP1 ... AP46	Probe alarm	Wrong wiring or configuration of probe. Damaged probe	Check probe wiring, check probe configuration parameters, check for probe damage.
ACFL	Condenser side flow switch alarm	No water flow in condenser circuit	Look for blockages in water circuit, check water flow sensor, check water pump performance
AtSF	Overload supply fan	Fan circuit overload	Check fan for dirt and damages. Check for bad wiring. Check if propeler is rotating freely
AtE(n)	Overload pump alarm of evaporator(n)	Overload detected on waterpump circuit (n)	Check water circuit filters, check water pump case temperature, check current draw and compare it to value written on nameplate
AtC(n)	Overload pump alarm of condenser(n)	Overload detected on waterpump circuit (n)	Check water circuit filters, check water pump case temperature, check current draw and compare it to value written on nameplate
AHFL	Domestic hot water pump flow switch alarm	Overload detected on DHW waterpump	Check water circuit filters, check water pump case temperature, check current draw and compare it to value written on nameplate
AEM1	IPROEX60D connection alarm	No connection between ipro and IPROEX60D	Check canbus connection between modules, check controller configuration, check if both modules is working, and LED's on them are lit
AET1	XEV20D 1 Connection alarm	No connection between ipro and XEV20D	Check canbus connection between modules, check controller configuration, check if both modules is working, and LED's on them are lit

ADDITIONAL INFORMATION FOR THE INSTALLER

AfnA	Function not available alarm	Incorrect parameter configuration regarding functionality	Correct parameters regarding setpoints, delta, and compressor relays
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Circuit alarm

Code	Alarm Description	Cause	Solution
b(n)AC	Anti-freeze alarm of the circuit (n) in chiller	Low water outlet temperature in chiller mode	Check if water filter is clean Check if outlet water temperature sensor is working
b(n)AH	Anti-freeze alarm signalling of the circuit (n) in heat pump	Low air outlet temperature in heat pump mode	Check for ice formation on the coil Check refrigerant charge Check if fan is working

Circuit alarm

Code	Alarm Description	Cause	Solution
b(n)Cu	Unloading high temp from condenser of the circuit (n)	Water/air temperature in the condenser too high	Make sure there is required flow in the water circuit Check refrigerant charge Bleed the system of any air
b(n)Eu	Unloading from low temp of the evaporator in the circuit (n)	Water/air temperature in the evaporator too low	Check if the coil is clean and there is sufficient airflow Check refrigerant charge
b(n)hP	High pressure on pressure transducer of circuit (n) warning	External air temperature low	Check if fan is working.
b(n)lP	Low pressure on pressure transducer of circuit (n) warning		Check coil for dirt and debris. Confirm that external conditions are sufficient for parameter configuration
b(n)LP	Low condensation pressure - (evaporation with low pressure transducer) circuit (n)		
b(n)dF	Circuit defrost alarm signal(n)	Defrost time has been expired	Check for ice formation on the coil. Check refrigerant charge. Check if fan is working. Check defrost parameters.
b(n)PH	Low pressure on pressure transducer of circuit	Low temperature/pressure on transducer	Check if fan is working. Check coil for dirt and debris.
b(n)PL	Low pressure on pressure transducer of circuit (n) during start-up		Confirm that external conditions are sufficient for this configuration. Check sensor configuration.

Compressor alarm

<i>Code</i>	<i>Alarm Description</i>	<i>Cause</i>	<i>Solution</i>
C(n)tr	Compressor (n) overload	Compressor load exceeded nominal values	Check refrigerant charge and working pressures. Check voltages and compressor current draw on all phase conductors.
C(n)dt	Compressor high discharge temperature	Compressor discharge temperature exceeded nominal values	Check if fan is working. Check coil for dirt and debris. Confirm that external conditions are sufficient for this configuration. Check sensor configuration

Unit timing*

<i>Time</i>	<i>Description</i>
300 s	Delay start unit after power ON
180 s	Minimum compressor ON time after the start-up
240 s	Minimum compressor OFF time after the switching off
20 s	ON delay time between two compressors. During this time the led of the next resource is blinking
5 s	OFF delay time between two compressors
60 s	ON compressor delay after evaporator water pump start-up
60 s	OFF delay evaporator water pump after the unit is turned in stand-by or OFF
26,0 bar	Condenser pressure start up fans
18,5 bar	Condenser pressure stop speed fans
30 s	Low pressure alarm delay from digital input after start-up compressor

ADDITIONAL INFORMATION FOR THE INSTALLER

3	Maximum number of low pressure events from digital/analogue inputs in one hour, with automatic reset
30 s	Evaporator Flow alarm delay from digital input after water
5 s	Evapor. Flow alarm delay from digital input with unit working
-10 °C	Anti-freeze alarm chiller setpoint
2 °C	Anti-freeze alarm differential for reset
125 °C	Discharge compressor temperature alarm
5,5 °C	User water pump activation set for antifreeze
FAN SPEED CONTROL (OPTIONAL)	
20,0	Condenser pressure start up fans
32,0	Condenser pressure max speed fans
35%	Minimum speed fans
80%	Maximum speed fans

** The data in tables are for the basic standard unit.*

<i>Indication</i>	<i>Cause</i>	<i>Solution</i>
The sight glass has a yellow colour core	Moisture present in the system	Evacuate refrigerant. Create vacuum for at least 15-30 minutes before reintroducing refrigerant into the system.
The outdoor unit is frozen	Low level of the refrigerant charge	Perform refrigerant recovery. Recharge the system with a new refrigerant.
	Anti-freeze thermostat malfunction	Make sure the thermostat is not covered by any object
Unit runs constantly in medium temperature mode	Setpoint is set to a higher temperature than the default (35°C)	Adjust thermostat setpoint back to default settings
	Heating capacity lower than the minimum	Clean finned coil surface from any debris
Unit does not switch between winter and summer mode	Reverse cycle valve malfunction	Contact AIC representative
	Thermostat malfunction	
The room temperature does not reach the setpoint	Unit power failure	Check if the unit is supplied with power, check if the main isolator is switched on.
	DHW production in 2-pipe system	Wait until DHW tank temperature setpoint is reached
The room temperature is above the setpoint	The room temperature settings are incorrect	Check and if needed correct: heating curve, heating mode, temperature setpoint, setpoint, time bands set.
No water in the tap	Unit power failure	Check if the unit is supplied with power, check if the main isolator is switched on.
	DHW settings are incorrect	Check and if needed correct: heating curve, heating mode, temperature setpoint, setpoint, time bands set.
Current draw measurements incorrect	Problem with wrong cable connections or damaged electricity receivers.	Check electric connections according to electric diagram, check receivers for abnormal temperatures, or noises.

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- › Register your product
- › Complete installation data
- › Complete commissioning data
- › Complete maintenance data
- › Order spare parts
- › and more...



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