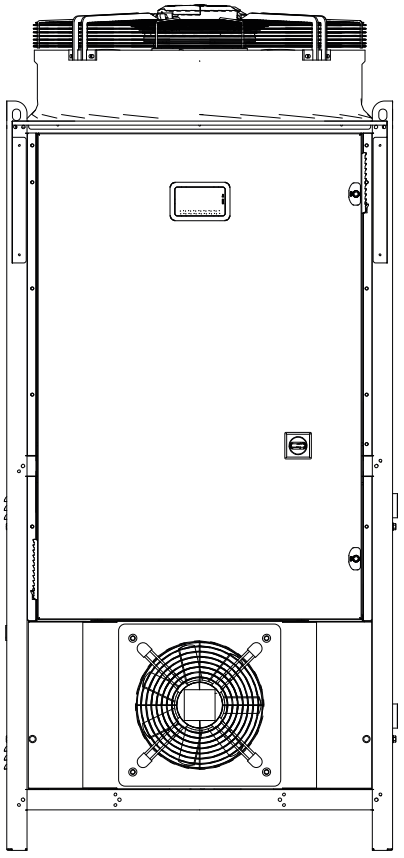
installation and maintenance manual

for the installer and the user

AURAX Natural i

29 to 93 kW

high efficiency reversible air to water heat pump



P-221898 • 00

EN

Table of Contents

General Information G-4
Liabilities of the Manufacturer, the Installer and the End user G-4
About this Manual G-5
Safety instructions G-7
Package Contents G-8
Unit marking G-8
Emergency stop G-9
Restarting after an emergency stop G-9
Health and Safety - Hazard and Prevention G-10
Product Description G-12
Aurax Natural i G-12
Options G-12
Accessories G-13
Main components - Models 29.1 to 56.1 - 2 pipes G-14
Main components - Models 29.1 to 56.1 - 4 pipes G-15
Main components - Models 72.2 to 93.2 - 2 pipes G-16
Main components - Models 72.2 to 93.2 - 4 pipes G-17
Control Panel and Main Functions G-18
Symbols and Functions on the Control Panel G-19
Technical Specifications G-20
Clearances G-24
ErP data G-26
Electrical data G-26
Sound data with Super Silence option G-26
Refrigerant circuit G-27
Primary circuit hydraulic data G-27
DHW circuit hydraulic data G-27
DHW circuit performance data G-27
Primary circuit performance data G-28
Water Quality Guidelines for Air-to-Water Heat Pumps G-29
Limits of Operation G-30
Correction factors G-31
Instructions for the User G-32
Safety Instructions for the User G-32
Disposal of the Product at the End of Service Life G-32
Operating the Controller - End User Level U-33
Safety Instructions for the Installation I-37
Product Installation I-37
Safety Instructions for Selecting the Location of Installation I-38
Handling the Unit I-40
Unpacking the Unit I-41
Installing and Preparing the Unit I-41
Opening and Closing the Panels I-42
Safety Instructions for the Hydraulic Connections I-43
Primary Circuit I-43
Domestic Hot Water Circuit I-43
Requirements for the Hydraulic Connections I-44
Flow Switch Installation I-45
Typical Hydraulic Connections - Primary I-46
System for the Production of DHW / Heating / Cooling I-47
Safety Instructions for the Electrical Connections I-49
Electrical Connections I-49
Power supply connection I-49
Connecting Optional Equipment I-50
Terminal block connections I-51
RS485 serial interface card as standard I-52
Installing a Remote Control Panel (option) I-53
Refrigerant Circuit Layout I-54
2-Pipe system I-54
4 Pipe system I-55
Commissioning I-56
Safety Instructions Before Start-up I-56
Filling the System I-56
Start-up and Commissioning I-57
Maintenance I-58
Safety Requirements for Maintenance I-58
General Maintenance Tasks I-59
Specific Maintenance Tasks I-60
Safety requirements for Repairs of the Refrigerant Circuit I-62
Discharging Refrigerant I-63
Leak Test of the Refrigerant Circuit I-64
Charging Refrigerant I-65
Draining Oil from the Compressor I-66
Decommissioning I-66
Operation Modes I-67
Cooling mode I-67
Heating mode I-67
Domestic hot water mode ( ) I-67
Additional Information for the Installer I-67
Default Values I-67
Setpoints I-67
Dynamic Setpoint (Weather Compensation) Function I-68
Operation of the Control Panel - Engineer Level I-69
Reading System Data - CIRC Function I-69
Reading System Data - PROBES Function I-70
Accessing the Service Functions I-70
Troubleshooting I-80

Index of Illustrations

Fig. 1. Location of the main switch G-9
Fig. 2. Control Panel G-18
Fig. 3. Dimensions of a one-module 2-pipe model (AN i 29.1 to AN i 56.1) G-20
Fig. 4. Dimensions for a 2 module 2-pipe model (AN i 72.2 to AN i 93.2) G-21
Fig. 5. Dimensions of a 1 module 4-pipe model (AN i 29.1 to AN i 56.1) G-22
Fig. 6. Dimensions of a 2 module 4-pipe model (AN i 72.2 to AN i 93.2) G-23
Fig. 7. Heat pump airflows I-38
Fig. 8. Anti-Snow Roof I-39
Fig. 9. Example of Wind Barrier I-39
Fig. 10. Handling the unit I-40
Fig. 11. Transporting the unit I-40
Fig. 12. Anti-vibration Damper Installation I-41
Fig. 13. Opening the Front Door I-42
Fig. 14. Opening a Panel (Rear and Sides) I-42
Fig. 15. Water filter installation I-44
Fig. 16. Flow switch installation I-45
Fig. 17. Primary Circuit Components I-46
Fig. 18. Example of Water System Diagram for 2-pipe Version I-47
Fig. 19. Example of Water System Diagram for 4-pipe Version I-48
Fig. 20. Electrical Components - Aurax Natural i 29.1 to 56.1 I-49
Fig. 21. Electrical Components - Aurax Natural i 72.2 to 93.2I-50
Fig. 22. Control Panel Connection to the Electronic Board I-53
Fig. 23. Principle of refrigeration diagram - 2 Pipe v ersion I-54
Fig. 24. Principle of refrigeration diagram - 4 Pipe version I-55

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**

Liabilities of the Manufacturer, the Installer and the End user

Manufacturer

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

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

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

- The failure to comply with the safety and installation instructions provided herein,
- The failure to comply with the safety and operation instructions and recommendations provided herein,
- The failure to have the appliance maintained regularly,
- A modification of the appliance that is not approved by the manufacturer,
- The use 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

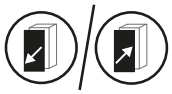
Ground / Earth.

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.

Symbols on the Packaging

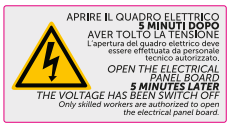
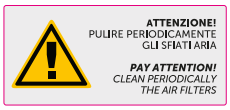
This side up

Keep dry

Fragile

Do not stack

Labels on the appliance

	Indicates the type of refrigerant used in the heat pump.
	Indicates that the electric box panel can only be opened 5 minutes after the voltage has been switched off. This operation can only be performed by qualified personnel
	Indicates the requirement to clean regularly the air filters.
	Indicates the requirement to check regularly that all electrical connections are tight.
	Indicates the mandatory installation of the flow switch and the filter on the return circuit (water inlet). If this instruction is not followed, the manufacturer will accept no liability in case of damages.
	Indicates the supply (outlet) circuit connection for Domestic Hot Water
	Indicates the return (inlet) circuit connection for Domestic Hot Water
	Indicates the supply (outlet) circuit connection for heating (primary) water
	Indicates the return (inlet) circuit connection for heating (primary) water
	Indicates where an air vent is located
	Indicates where to connect the flow switch
	Indicates the condensate drain connection
	Indicates where to connect the outdoor sensor cable
	Indicates the power supply cable connection
	Indicates a circuit that needs to be disconnected before maintenance or repair

Safety instructions

THIS UNIT CONTAINS REFRIGERANT R290 WHICH IS A HIGHLY FLAMMABLE SUBSTANCE

Single-component refrigerant identification: R290 - Chemical formula: C3H8

- Use care when handling this substance - 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

- Aurax Natural i heat pump,
- Ambient air temperature probe (refer to ***"AMBIENT air temperature (signal)" on page I-51 for the correct connection)***,
- Flow switch (Refer to ***"Flow Switch Installation" on page I-45)***
- Key to open the front door
- Installation and Maintenance manual,
- Set of documentation, containing electrical data and declaration of conformity.

Additional accessories may be part of the package, depending on the order placed with AIC.

Refer to ***"Unpacking the Unit" on page I-41*** for the complete unpacking and installation instructions.*

Unit marking

The data plate is located at the front of the heat pump.

CE 0496

Manufacturer: Frost Italy S.r.l.
Via Lago di Trasimeno n.46
36015 Schio -Vi-Italy

N° SERIE SERIAL NUMBER / NUMÉRO DE SÉRIE	**24ANI2072P020001 (24.0.148)**			
ANNO YEAR / ANNÉE **2024**	**MODEL:**	**Aurax Natural i 72.2 R290**		
POTENZA FRIGORIFERA (COOLING CAPACITY/PUISSANCE FRIGORIFIQUE)	57	**[kW]**	GWP (AR5)	3
POTENZA TERMICA (HEATING CAPACITY/PUISSANCE THERMIQUE)	72,1	**[kW]**	REFR. CLASS	A3
POTENZA ELETTRICA MASSIMA (MAX ABSORBED POWER/PUISSANCE ABSORBÉE MAX)	24,9	**[kW]**	PED GROUP	1
CORRENTE ELETTRICA MASSIMA (MAX OPERATING CURRENT/INTENSITÉ MAX DE FONCT.)	45	**[A]**	PED CAT.	III
CORRENTE DI SPUNTO (STARTUP CURRENT/COURANT DE DÉMARRAGE)	45	**[A]**	PS_HP [bar]	30
CARICA DI REFRIGERANTE (REFRIGERANT CHARGE/CHARGE DE RÉFRIGÉRANT)	8	**[kg]**	PS_LP [bar]	20
tCO_2 (tCO_2/tCO_2)	0,024	**[t]**	TS_HP [°C]	-10/120
PESO (WEIGHT/POIDS)	930	**[kg]**	TS_LP [°C]	-40/15
TIPO DI ALIMENTAZIONE (POWER SUPPLY TYPE/TYPE D'ALIMENTATION EL.)	400/50/3+PE	**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 RÉGIS PAR LE PROTOCOLE DE KYOTO

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:

- Turn the main switch (yellow and red) (**1**) 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.

The illustration shows a one-module model, but the layout is identical for two-module models

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 (**1**) 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*.

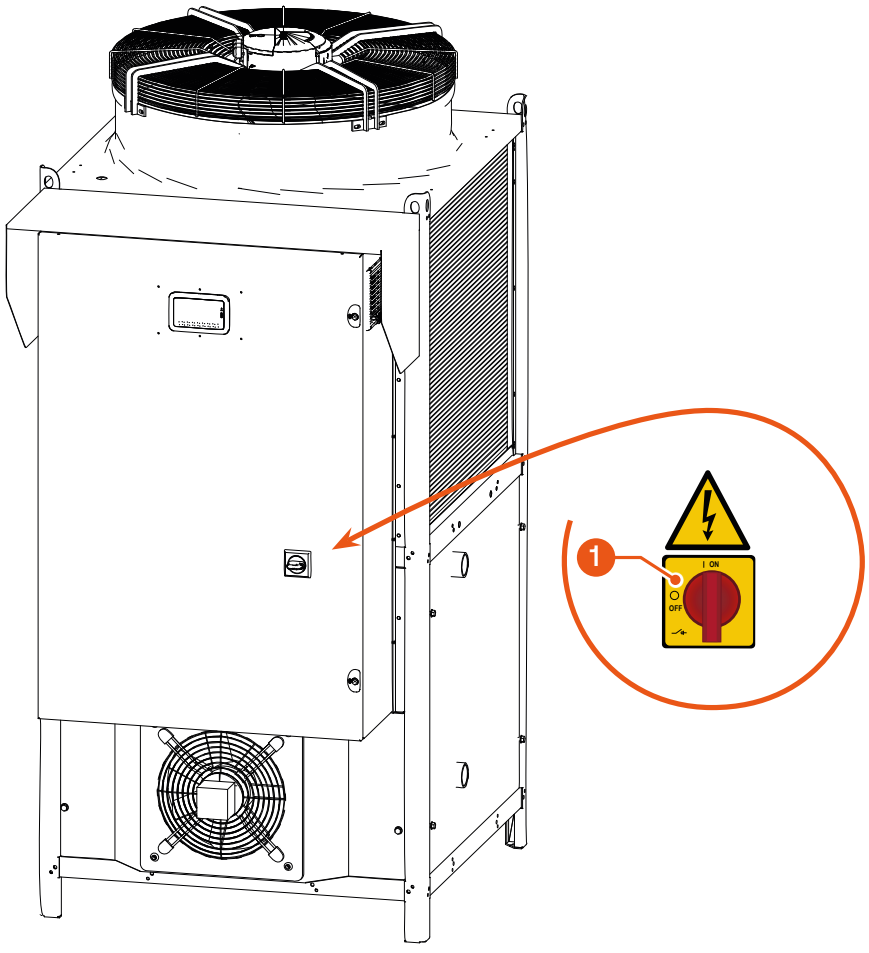
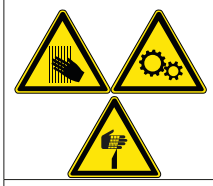
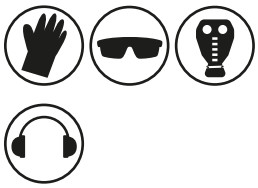


Fig. 1. Location of the main switch

Health and Safety - Hazard and Prevention

<table>
<tr><th>Danger</th><th>Location</th><th>Potential Injuries</th><th>Prevention</th><th>First Aid</th></tr>
<tr><td>  </td><td>Heat exchanger fins</td><td>› Cuts
› Hand injuries</td><td>  </td><td rowspan="2">› Clean the wounds with disinfectant
› Dress the wounds
› In case of severe injuries, seek medical assistance</td></tr>
<tr><td>  </td><td>Fan and fan grids</td><td>› Cuts
› Hand/eye injuries
› Broken bones</td><td> 
Do not put objects through the protection grids</td></tr>
<tr><td rowspan="3">  </td><td>› Compressors Discharge pipes</td><td rowspan="2">› Burns (contact with hot surface)
› Frostbites (contact with refrigerant)
› Poisoning (contact with skin or eyes, inhalation or ingestion)</td><td rowspan="2"> 
Check the pressure</td><td rowspan="3">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 sings 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</td></tr>
<tr><td>Low pressure safety valve (refrigerant circuit)</td></tr>
<tr><td>High pressure safety valve (refrigerant circuit)</td><td>› Burns (heat/ contact with refrigerant or hydraulic oil)
› Poisoning (contact with skin or eyes, inhalation or ingestion)
› Loss of hearing</td><td> 
Check the pressure</td></tr>
</table>

Danger	*Location*	*Potential Injuries*	*Prevention*	*First Aid*
	▸ 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 is installed outdoors and there is sufficient ventilation. ▸ Make sure that the heat pump is not installed close to a source of flame. ▸ Avoid all possible sources of ignition (flames or sparks) and static discharge of oxidizing material. ▸ Do not cut, weld, braze, solder drill or grind R-290 circuit.	**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

Fire-Fighting

To fight a fire due to R290,

- **Use sprayed water or dry powder**
- **Cool the containers by spraying them with water from a protected position.**
- **If possible, stop the refrigerant leak.**
- **If possible, use sprayed water to suppress fumes.**
- **Move the containers away from the fire zone, if this can be done without risk.**

Aurax Natural i

General Description

The Aurax Natural i is a high-efficiency air-to-water heat pump, for outdoor installation. All models are reversible, meaning they can also produce chilled water.

All 2-pipe models are equipped with two hydraulic connections, and through the activation of an external 3-way valve (optionally) allows for priority year-round production of domestic hot water (DHW), hot water for heating in the winter period and chilled water for cooling in the summer period.

The 4-pipe models have 2 additional connections dedicated for domestic hot water system (external 3-way valve is not required).

The units are equipped with piston-type compressors that efficiently use the refrigerant cycle when the source temperature is low. The compressors are protected by a crankcase heater and a thermal overload protection. They are installed in a separate enclosure, allowing maintenance during operation.

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

The units are equipped with a reverse cycle valve that allows easy defrost in winter. The function is managed automatically by the controller and also allows summer/winter change over.

Refrigeration circuit

The refrigeration circuit is made of components from leading international companies, according to Directive 2014/68/EU (PED) about the construction of pressure equipment and EN 13134 about brazing processes. The refrigerant gas used is R290 (propane) and is flammable.

The circuit includes the following equipment: filter dryer, high and low pressure switches and pressure transducers, liquid and humidity indicator, service connections, 3-way 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.

It offers frost protection, compressor timing, compressor start sequence (in the case of multiple compressors present), and alarm reset.

The control panel has a display and user interface. The controller is set to handle automatic defrosting (when operating under severe outdoor conditions) and summer/winter switching.

The controller is also capable of managing an anti-Legionella thermal shock program and co-sending DHW by enabling specific functions. The controller can be connected to BMS remote control system using the Modbus protocol.

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
- safety valves on the refrigerant circuit
- refrigerant leak detector
- extraction fan (in case of refrigerant leak).

Options

4-pipe system

Thanks to a dedicated hydraulic circuit, the Aurax heat pump with 4-pipe system produces DHW year-round as a priority, hot water for heating in winter, and chilled water for cooling in summer.

In summer, it can produce chilled water and domestic hot water simultaneously with total heat energy recuperation, significantly reducing energy costs.

The unit is to be combined with a 4-pipe system where 2 pipes are dedicated to the user circuit (heating/cooling) and 2 pipes are dedicated to the domestic hot water (DHW) circuit.

Super Silence

With the Super silence option, in addition to the compartment where the compressors are located being silenced, each compressor is covered with a bell of a highly soundproofing material.

Also, all fans are coupled with AxiTop diffusers that, while maintaining the same air flow, are able to reduce the unit sound power and energy consumption (by up to 27 % compared to the standard version). The simultaneous action of these two measures results in a reduction of the sound power by 4 to 5 dB(A).

Accessories

Single pump kit for heating/cooling

This 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.

Centrifugal fan

The option involves replacing the axial fans, provided in the standard version, with high-performance Plug Fan EC centrifugal fans that make it possible to duct air in expulsion. The swivelling plenum provided for each individual fan and included in the option, facilitates the connection to the exhaust duct so as to allow the installation of the heat pump inside a technical room, in any case adequately ventilated.

Refrigerant gas leak detector

Electronic device with semiconductor sensor, it is Installed in the compressor compartment. In the presence of refrigerant gas, it sends alarm signal to the microprocessor, which shuts down all equipment in the unit but does not disconnect its power supply.

Heat exchanger antifreeze resistance

Heating element (flexible resistance band) installed to protect the plate heat exchanger inside the unit in both the standard (2-pipe system) and optional (4-pipe system) versions.

Condensate tray heating element

Heating element to prevent ice formation inside the condensate tray.

Electronic soft starter*

Electronic device that reduces the inrush current to the same value as the maximum operating current. The option is provided for each type of compressor.

Refrigerant pressure gauges

Installed on the board of the unit, they enable quick reading of the operating pressures of the refrigerant circuit.

Compressor shut-off valve

It allows the compressor to be isolated from the refrigerant, facilitating maintenance operations.

Heat exchanger anti-corrosion treatment

Special treatment for installations located near the seaside or in aggressive environment, where anti-corrosion treatment is required for exchanger.

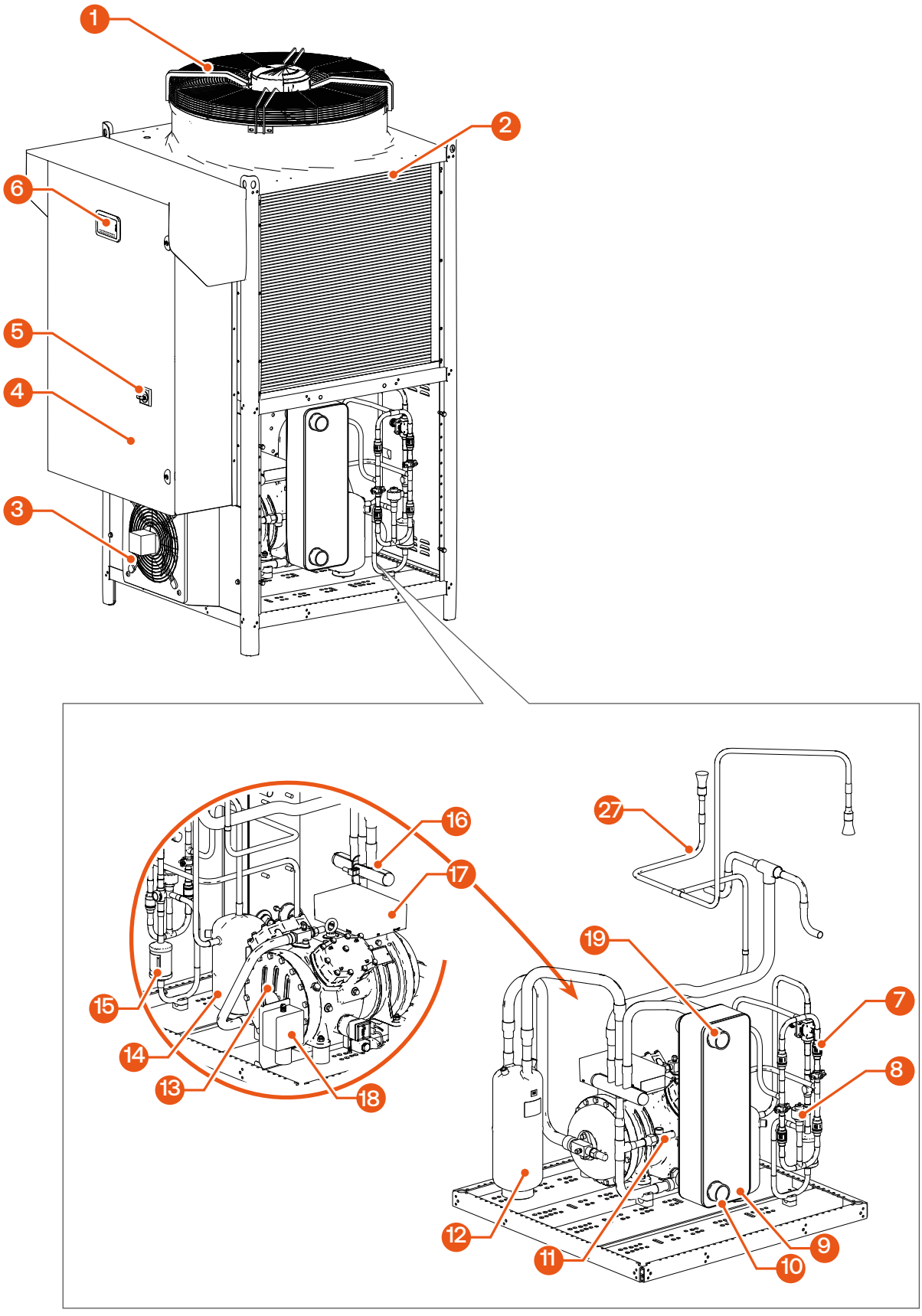
Anti-vibration rubber dampers

They reduce the transmission of vibrations produced by the unit. They should be installed on the feet of the unit for optimal performance

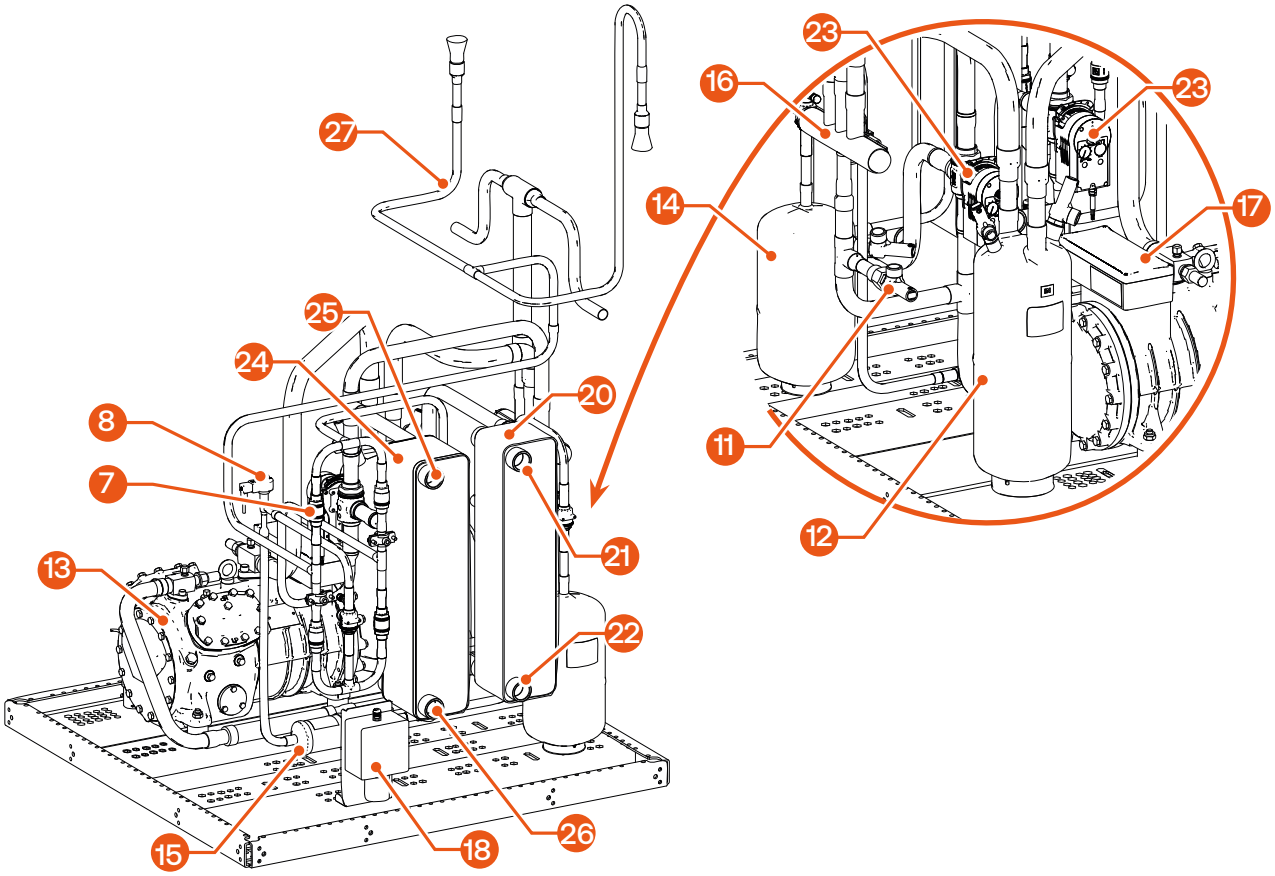
For more information regarding the available accessories, please contact your AIC representative.

** Not applicable to the Inverter heat pump.*

Main components - Models 29.1 to 56.1 - 2 pipes



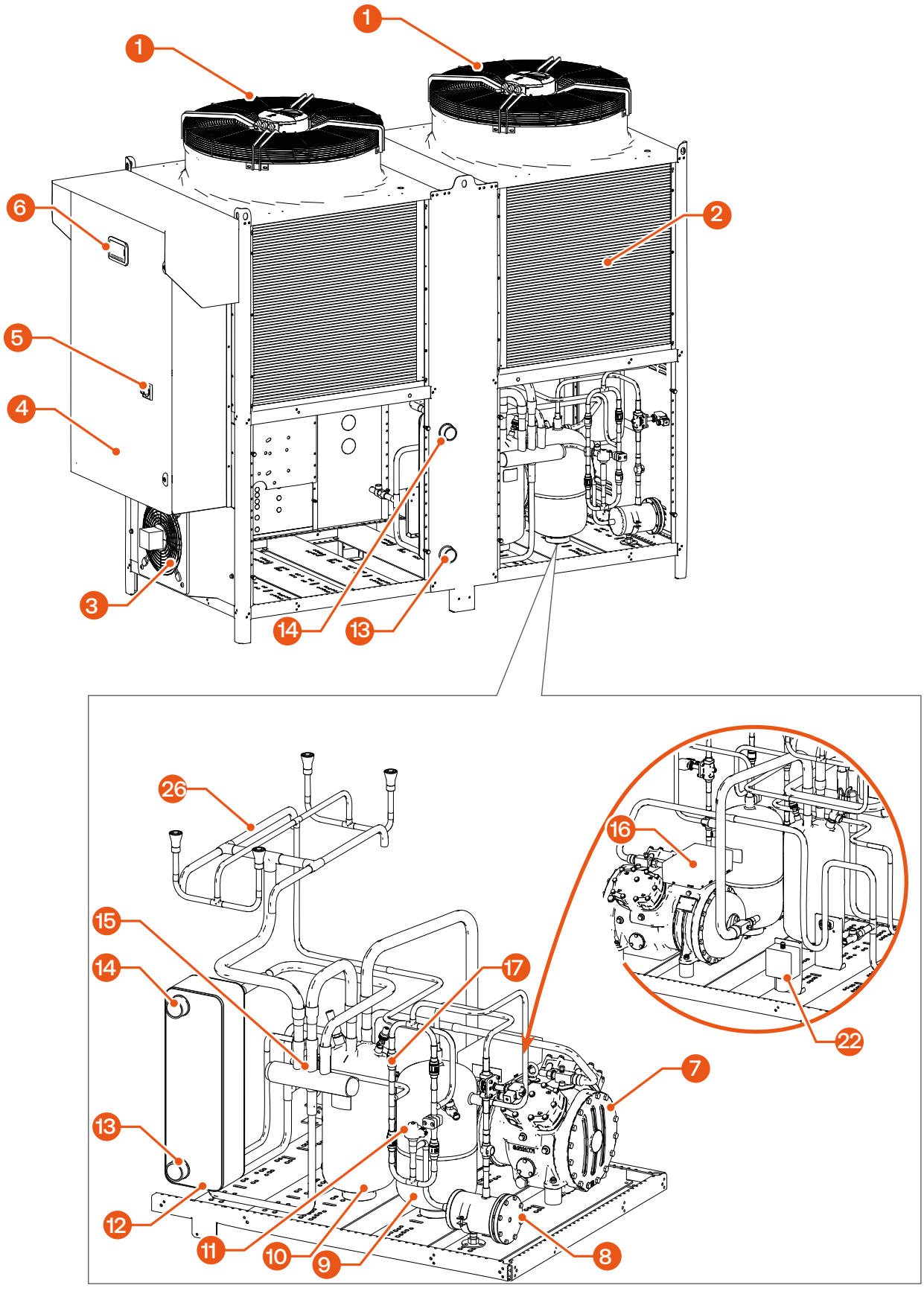
Main components - Models 29.1 to 56.1 - 4 pipes



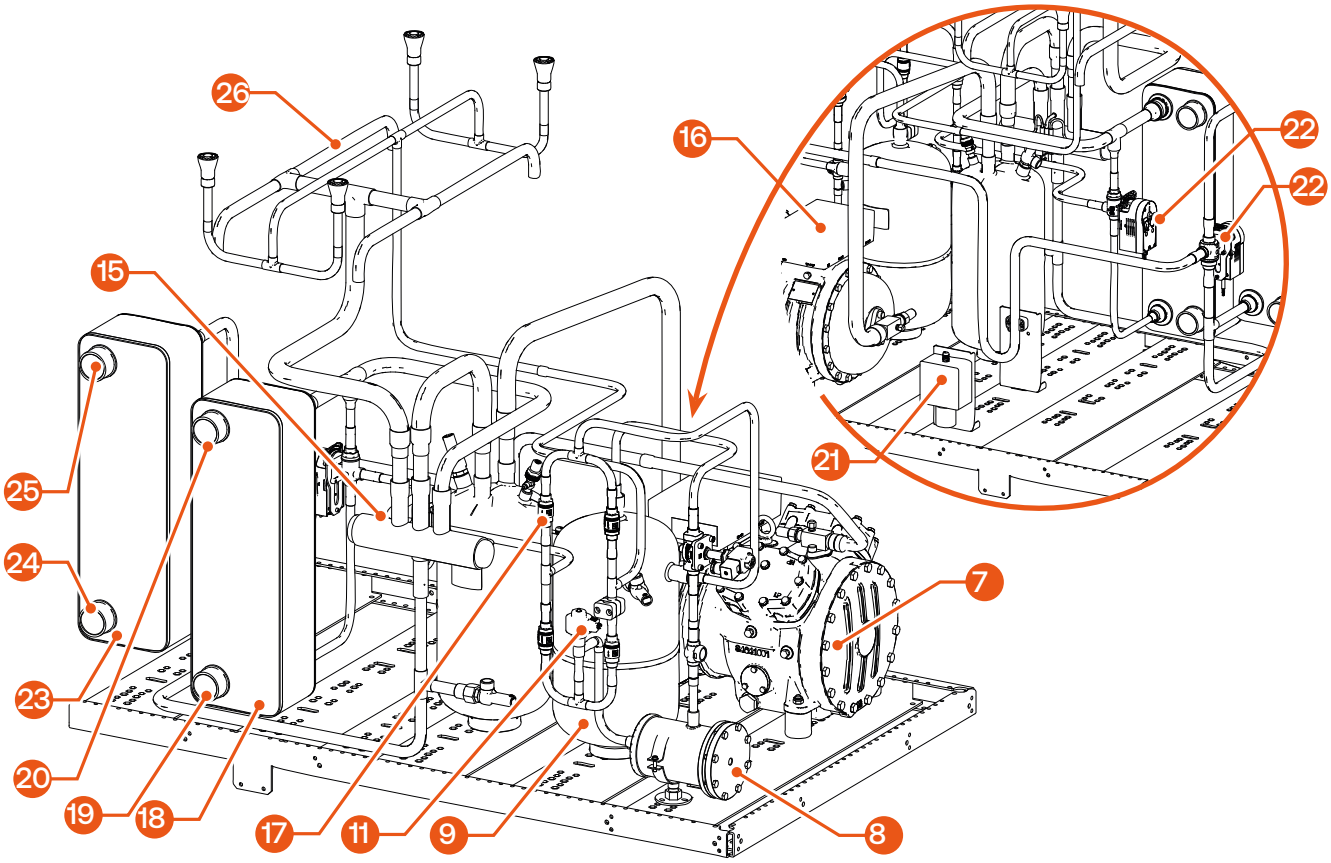
Legend

1. Axial fan with guard
2. Finned coil heat exchanger (both sides)
3. Exhaust fan for compressor compartment,
4. Electric box with hinged front door
5. Emergency stop (main switch)
6. Controller
7. Check valve (x4) of refrigerant circuit
8. Expansion valve
9. Plate heat exchanger (2 pipe model)
10. Heating return connection (inlet)
11. Safety valve
12. Liquid separator
13. Compressor (w/ inverter)
14. Liquid receiver
15. Filter dryer
16. 4-way reversing valve
17. Compressor electric box
18. Gas leak detector
19. Heating supply connection (outlet)
20. Plate heat exchanger (Heating - 4 pipe model)
21. Heating supply connection
22. Heating return connection
23. 3-way motorized control valve (x2, one per hydraulic circuit)
24. Plate heat exchanger (DHW - 4 pipe model)
25. Hot water outlet connection
26. Cold water inlet connection
27. Circuit to fin-coil heat exchanger

Main components - Models 72.2 to 93.2 - 2 pipes



Main components - Models 72.2 to 93.2 - 4 pipes



Legend

1. Axial fan with guard (x2)
2. Finned coil heat exchanger (x2, both sides)
3. Exhaust fan for compressor compartment,
4. Electric box with hinged front door
5. Emergency stop (main switch)
6. Controller
7. Compressor (w/ inverter)
8. Filter dryer
9. Liquid receiver
10. Liquid separator
11. Expansion valve
12. Plate heat exchanger (2 pipe model)
13. Heating return connection (inlet)
14. Heating supply connection (outlet)
15. 4-way reversing valve
16. Compressor electric box
17. Check valve (x4) of refrigerant circuit
18. Plate heat exchanger (Heating - 4 pipe model)
19. Heating return connection
20. Heating supply connection
21. Gas leak detector
22. 3-way motorized control valve (x2, one per hydraulic circuit)
23. Plate heat exchanger (DHW - 4 pipe model)
24. Cold water inlet connection
25. Hot water outlet connection
26. Circuit to fin-coil heat exchanger

Control Panel and Main Functions

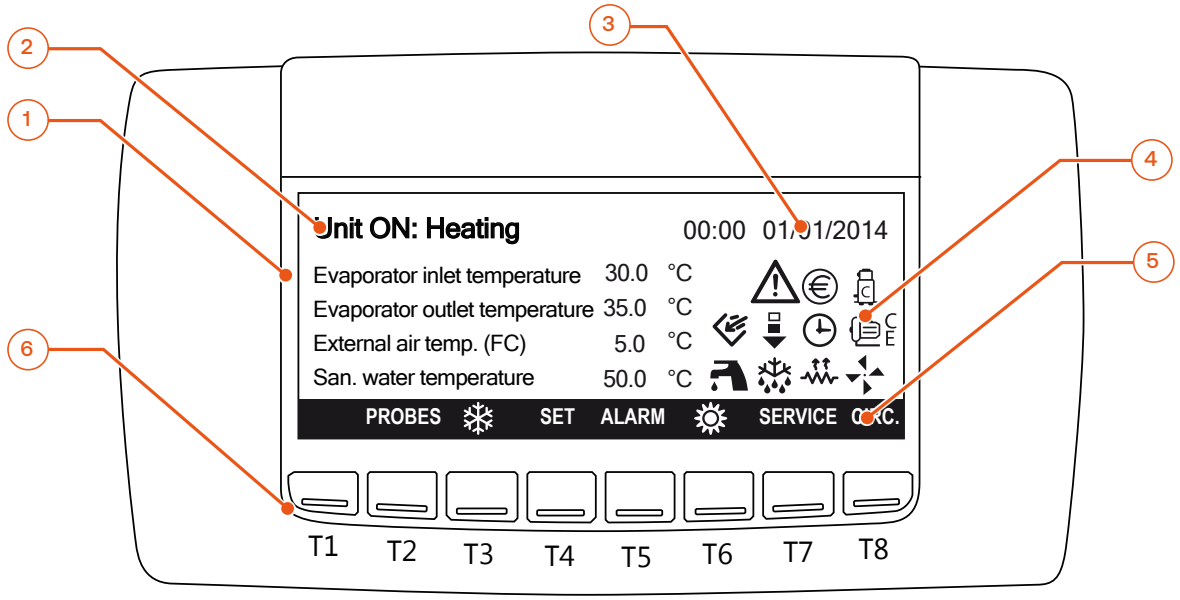


Fig. 2. Control Panel

KEY

1. **LCD Display** - The display contains the operating information, parameters, symbols, messages and menus. For a detail of the symbols and menus displayed on the screen, see ***"Symbols and Functions on the Control Panel" on page G-19***.
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 ***"Control panel - Screen and Language Setup" on page U-36***.

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.*

Dimensions and weight

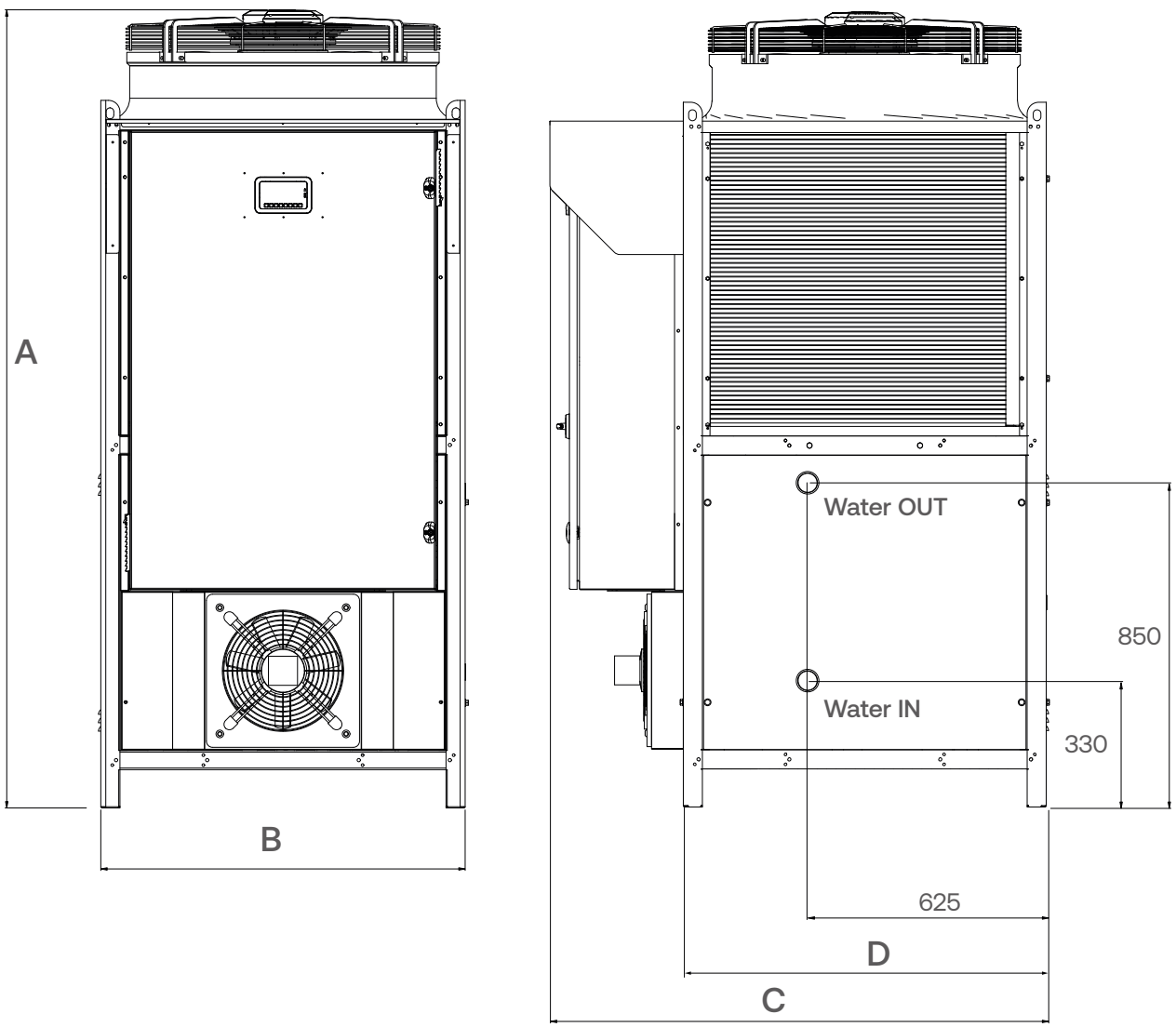


Fig. 3. Dimensions of a one-module 2-pipe model (AN i 29.1 to AN i 56.1)

dimensions and weight			AURAX NATURAL i 2 PIPES				
			AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
A	height (without antivibration feet)	mm	2085	2085	2085	2085	2085
	height (with antivibration feet)	mm	2285	2285	2285	2285	2285
B	width	mm	950	950	950	950	950
C	length	mm	1300	1300	1300	2475	2475
D	length (feet)	mm	950	950	950	2125	2125
	weight (2-pipes)	kg	520	525	530	830	840

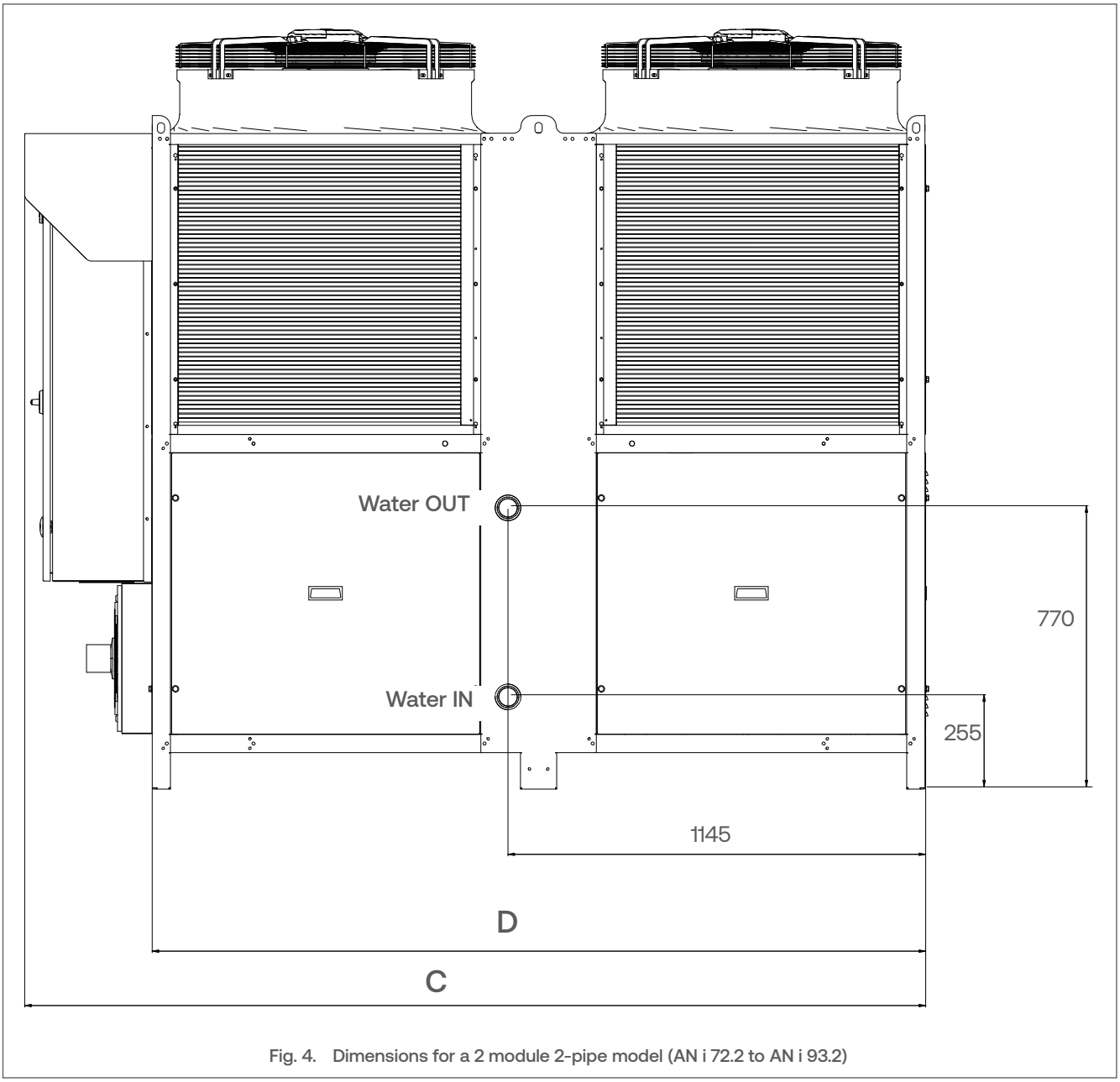


Fig. 4. Dimensions for a 2 module 2-pipe model (AN i 72.2 to AN i 93.2)

connection dimensions		AURAX NATURAL i 2 AND 4 PIPES				
		AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
flow/return threaded connections Ø [F]	in.	1 ¼	1 ¼	1 ¼	2	2

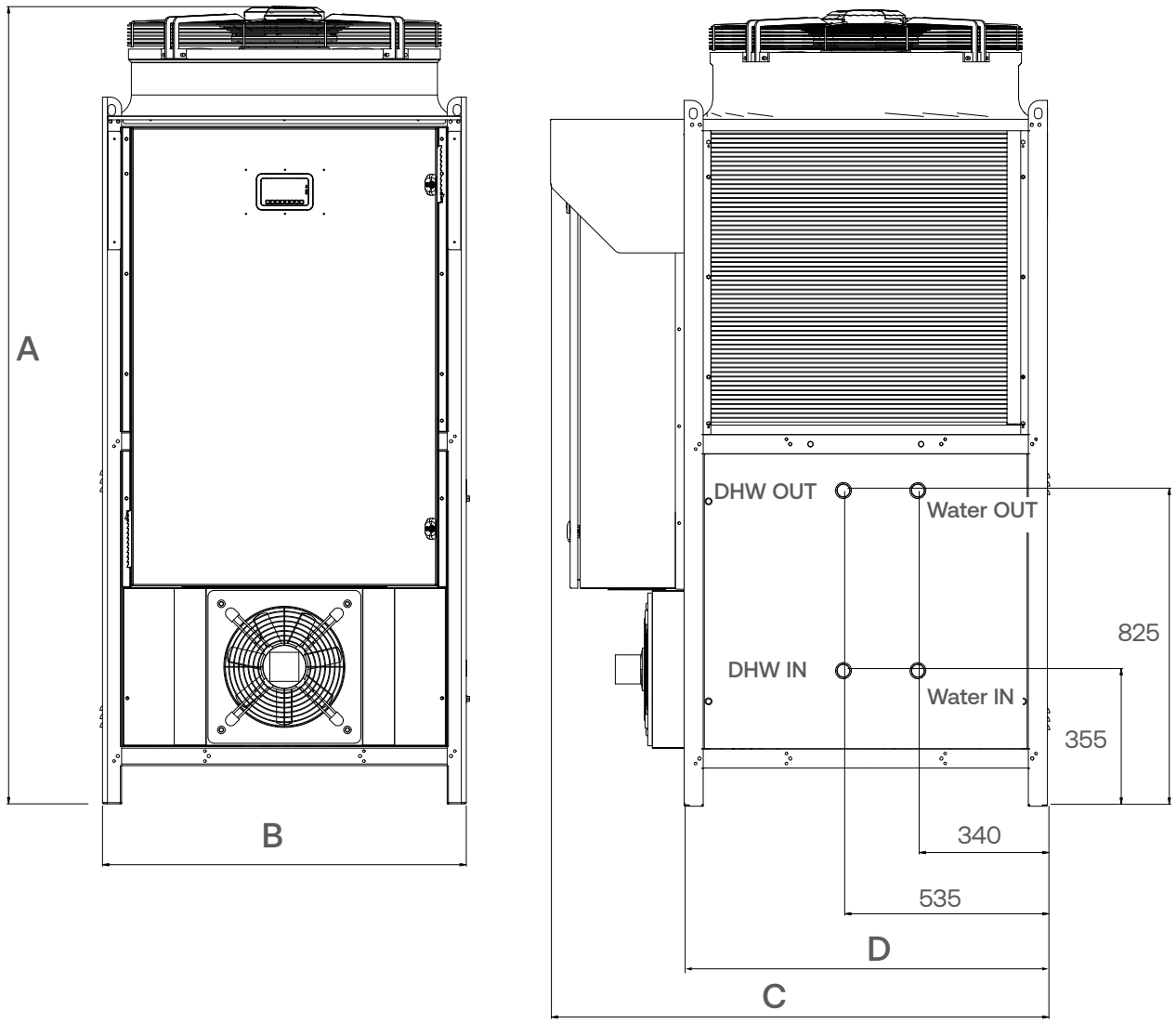


Fig. 5. Dimensions of a 1 module 4-pipe model (AN i 29.1 to AN i 56.1)

dimensions and weight			AURAX NATURAL i 4 PIPES				
			AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
A	height (without antivibration feet)	mm	2085	2085	2085	2085	2085
	height (with antivibration feet)	mm	2285	2285	2285	2285	2285
B	width	mm	950	950	950	950	950
C	length	mm	1300	1300	1300	2475	2475
D	length (feet)	mm	950	950	950	2125	2125
	weight (4-pipes)	kg	535	545	550	850	850

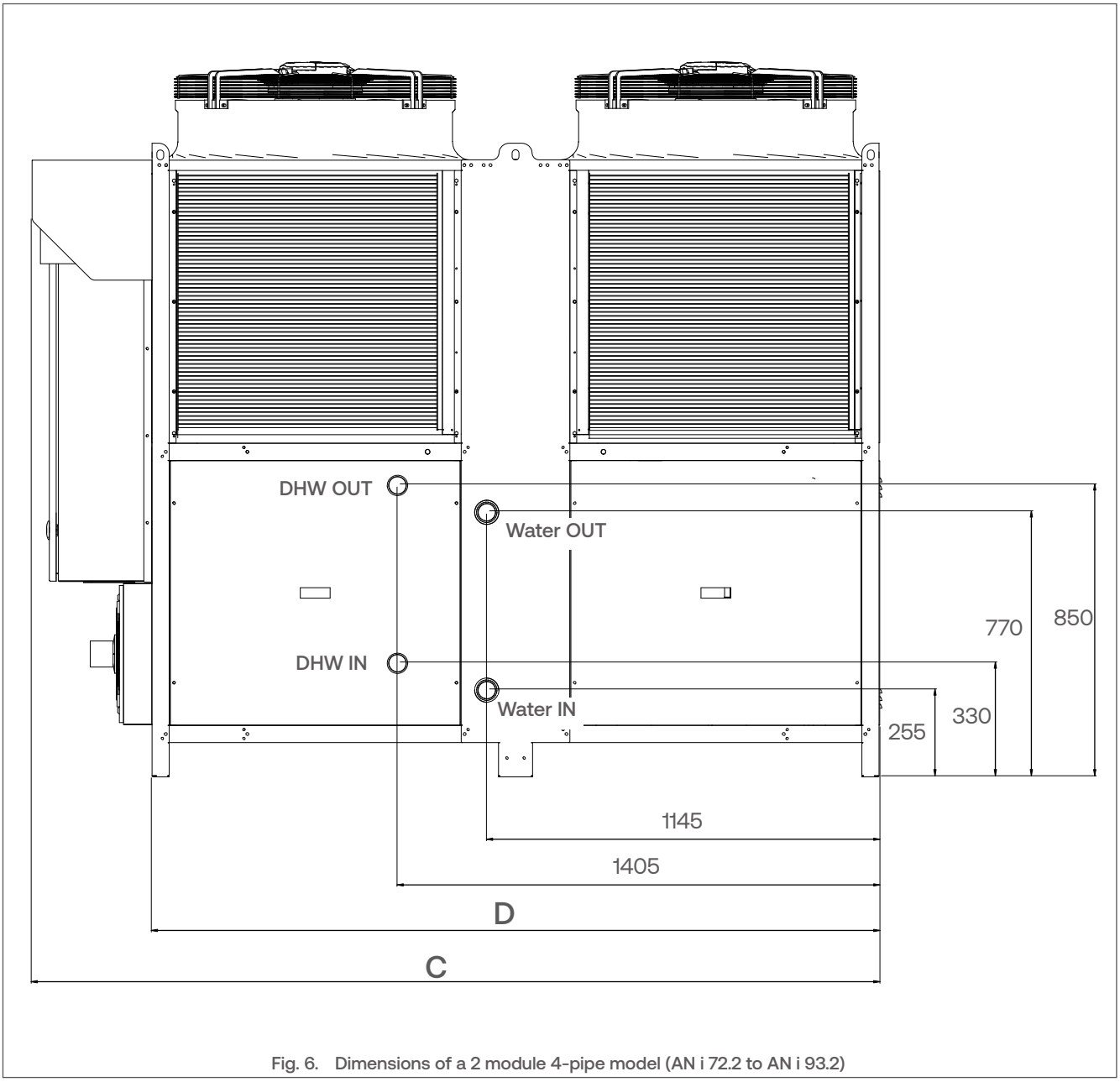
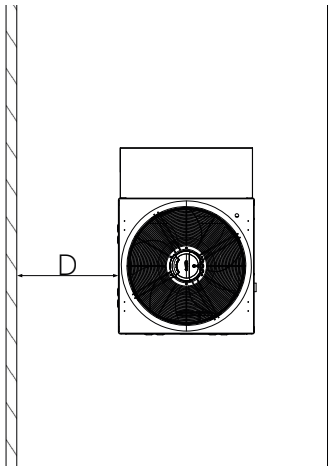
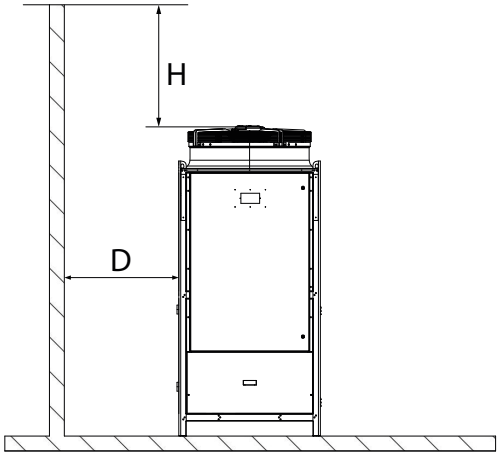


Fig. 6. Dimensions of a 2 module 4-pipe model (AN i 72.2 to AN i 93.2)

Clearances

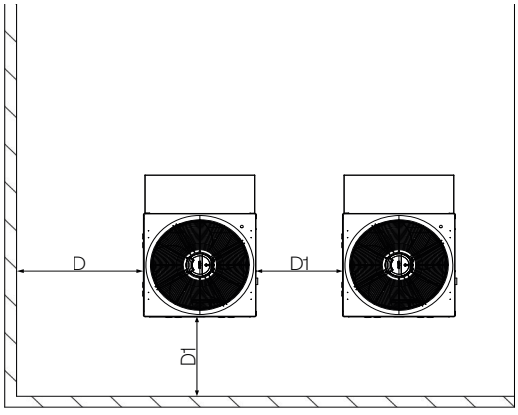


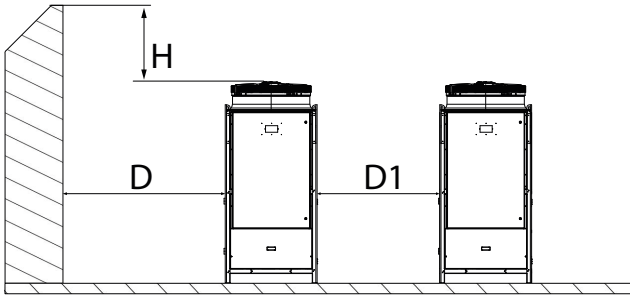


Number of heat pumps	H≤0 [m]	0≤H≤1 [m]	1≤H≤3 [m]	3≤H [m]
		D		
1	1,2	1,2	1,2	1,2
2	1,2	1,2	1,2	1,2
3	1,2	1,2	1,2	1,35
4	1,2	1,2	1,35	1,5
5≥	1,2	1,35	1,5	1,65

** Minimum distance for service*

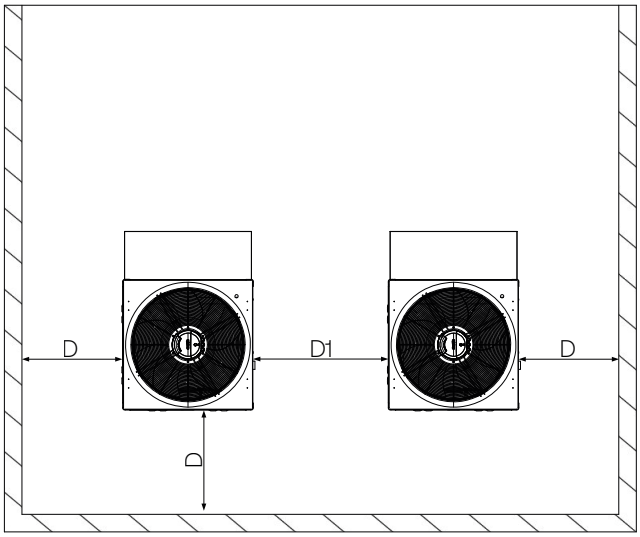
Wall layout - 2 walls (L shape)





Number of heat pumps		H≤0 [m]	0≤H≤1 [m]	1≤H≤3 [m]	3≤H [m]
	D1* [m]		D [m]		
1	1,2	1,2	1,2	1,2	1,2
2	1,2	1,2	1,2	1,35	1,5
3	1,2	1,35	1,35	1,5	1,65
4	1,2	1,5	1,5	1,65	1,8
5≥	1,2	1,65	1,65	1,8	1,95

Wall layout - 3 walls.



Number of heat pumps	D1* [m]	H≤0 [m]	0≤H≤1 [m]	1≤H≤3 [m]	3≤H [m]
			D [m]		
1	1,2	1,2	1,2	1,2	1,2
2	1,2	1,35	1,5	1,65	1,8
3	1,2	1,5	1,65	1,8	1,95
4	1,2	1,65	1,8	1,95	2,1
5≥	1,2	1,8	1,95	2,1	2,25

** Minimum distance for service*

ErP data

		AURAX NATURAL i 2 AND 4 PIPES				
		AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
air to water heat pump	Y/N	Y	Y	Y	Y	Y
low-temperature heat pump	Y/N	N	N	N	N	N
equipped with a suplementary heater	Y/N	N	N	N	N	N
heat pump combination heater	Y/N	N	N	N	N	N
temperature application	°C	35 / 55	35 / 55	35 / 55	35 / 55	35 / 55
climate conditions		average	average	average	average	average
SCOP* 35 °C		4,33	4,32	4,20	3,90	4,22
annual energy consumption QHE 35 °C	GJ	50	70	100	137	165
seasonal space heating energy efficiency ηs 35 °C	%	173	173	168	156	169
seasonal space heating energy efficiency class**		A++	A++	A++	A++	A++
range of energy efficiency classes				A+++ → D		
SCOP* 55 °C		3,30	3,47	3,32	3,13	3,31
seasonal space heating energy efficiency ηs 55 °C	%	132	139	133	125	132
seasonal space heating energy efficiency class**		A++	A++	A++	A++	A++
range of energy efficiency classes				A+++ → D		
SEER (7 °C)		4,64	4,78	4,60	4,23	4,62
Seasonal space cooling efficiency ns,c 7°C	%	182	187	181	166	181
sound power level, outdoors LWA (EN 3744)	dB(A)	74	77	79	82	82
sound pressure level LpA @ 10m (EN 12102)	dB(A)	46	49	51	54	54

** according to EN 14511*

*** Reg. UE 813/2013*

Electrical data

		AURAX NATURAL i 2 AND 4 PIPES				
		AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
supply voltage/phase/freq.	V/ph/Hz	400/3+PE/50	400/3+PE/50	400/3+PE/50	400/3+PE/50	400/3+PE/50
nom. power input	kW	7,7	10,9	15,5	20,5	25,7
max. power input	kW	8,3	12,5	18,0	24,9	31,0
nom. absorbed current	A	15,0	21,0	28,0	37,0	46,0
max. absorbed current	A	16,0	24,0	32,4	45,0	56,0

Sound data with Super Silence option

		AURAX NATURAL i 2 AND 4 PIPES				
		AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
sound pressure level LpA @ 10m	dB (A)	71	73	75	76	77
sound power level, outdoors LWA	dB (A)	43	45	47	48	49

Refrigerant circuit

		AURAX NATURAL i 2 AND 4 PIPES				
		AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
number of circuits		1	1	1	1	2
number of compressors		1	1	1	1	2
compressor type		Piston	Piston	Piston	Piston	Piston
refrigerant gas type		R290	R290	R290	R290	R290
refrigerant charge	kg	2,0	3,0	3,5	4,3	5,0
GWP IPCC AR5 (100 years)		3	3	3	3	3
number of fans		1	1	1	2	2
rated air flow rate, outdoors	m3/h	12500	12500	18000	28000	36000
diameter of fan	mm	800	800	800	800	800

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

Primary circuit hydraulic data

			AURAX NATURAL i 2 AND 4 PIPES				
			AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
heating	min water content	l	293	433	602	770	523
	recommended water tank vol.	l	586	866	1204	1540	1046
	pressure drop at ΔT = 5K	kPa	45	46	48	48	47
	max. operating pressure	MPa	1	1	1	1	1
	min. operating temperature	°C	5	5	5	5	5
	max. operating temperature	°C	70	70	70	70	70
	nom. water flow rate at ΔT = 5K	m^3/h	5,0	7,0	9,7	12,4	16,1

DHW circuit hydraulic data

		AURAX NATURAL i 4 PIPES				
		AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
minimum water tank volume	l	293	433	602	770	523
recommended water tank volume	l	586	866	1204	1540	1046
water flow rate	m^3/h	5,0	7,0	9,7	12,4	16,1
water pressure drop	kPa	48	48	48	48	47
max. operating pressure	MPa	1	1	1	1	1

DHW circuit performance data

		AURAX NATURAL i 2 AND 4 PIPES				
DHW A35/W55*		AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
domestic hot water capacity	kW	22,7	35,5	50,3	59,5	81,0
COP		2,97	3,25	3,13	2,96	3,12

** selon EN 14511*

Primary circuit performance data

			AURAX NATURAL i 2 AND 4 PIPES				
Heating			AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
heating*(A7/W35)	max. heating capacity	kW	29,4	44,4	58,6	72,1	93,5
	min. heating capacity	kW	13,2	20,0	32,1	39,5	51,2
	nom. heating capacity	kW	29,4	40,7	56,4	72,1	93,5
	nom. power input	kW	6,4	9,0	12,8	17,5	21,0
	COP		4,60	4,54	4,40	4,10	4,40
heating*(A7/W55)	max. heating capacity	kW	24,7	41,5	53,8	62,3	83,4
	min. heating capacity	kW	11,8	19,8	27,4	31,7	42,5
	nom. heating capacity	kW	24,7	37,1	51,8	62,3	83,4
	nom. power input	kW	8,4	11,4	16,3	20,9	10,1
	COP		3,00	3,30	3,20	3,00	3,30
heating*(A2/W35)	max. heating capacity	kW	22,9	38,6	50,8	66,9	88,2
	min. heating capacity	kW	11,9	20,0	27,6	38,3	53,0
	nom. heating capacity	kW	25,7	38,6	50,8	66,9	88,2
	nom. power input	kW	7,3	10,0	13,1	17,2	22,5
	COP		3,50	3,90	3,90	3,90	3,90
heating*(A2/W55)	max. heating capacity	kW	21,5	36,1	46,5	60,0	77,3
	min. heating capacity	kW	10,2	17,1	23,5	32,3	44,3
	nom. heating capacity	kW	24,0	36,1	46,5	60,0	77,3
	nom. power input	kW	9,6	13,0	16,6	21,1	26,8
	COP		2,50	2,80	2,80	2,90	2,90
heating*(A-7/W35)	max. heating capacity	kW	18,0	30,2	39,6	51,9	68,2
	min. heating capacity	kW	8,8	14,8	21,4	31,0	44,9
	nom. heating capacity	kW	20,1	30,2	39,6	52,0	68,2
	nom. power input	kW	6,7	9,1	12,0	15,8	20,8
	COP		3,00	3,30	3,30	3,30	3,30
Cooling							
cooling*(A35/W7)	max. cooling capacity	kW	23,4	34,2	47,0	64,6	88,8
	min. cooling capacity	kW	14,0	21,0	34,0	55,0	89,1
	nom. cooling capacity	kW	23,4	34,2	47,0	57,0	78,2
	nom. power input	kW	7,7	10,9	15,5	20,5	25,7
	EER		3,10	3,10	3,00	2,80	3,00
cooling*(A35/W18)	max. cooling capacity	kW	33,4	48,8	64,0	83,8	109,7
	min. cooling capacity	kW	19,6	29,4	33,2	37,4	42,2
	nom. cooling capacity	kW	33,4	48,8	64,0	83,8	109,7
	nom. power input	kW	9,3	13,1	19,6	29,4	44,1
	EER		3,40	3,50	3,30	3,10	2,90

** in accordance with EN 14511*

Combined mode (4 pipes)		AURAX NATURAL i 4 PIPES				
(DHW 55°C - W18°C)		AN i 29.1	AN i 41.1	AN i 56.1	AN i 72.2	AN i 93.2
domestic hot water capacity	kW	34,5	54,6	55,6	56,6	57,6
cooling capacity	kW	20,4	38,6	32,1	27,6	24,3
COP		4,21	4,47	5,47	6,47	7,47
EER		2,49	3,16	3,16	3,16	3,16
TER		6,70	7,63	8,63	9,63	10,63
(DHW 55°C - W7°C)						
domestic hot water capacity	kW	26,2	40,7	53,5	62,1	90,7
cooling capacity	kW	15,6	11,8	15,6	20,0	26,5
COP		3,20	3,40	3,40	3,10	3,40
EER		1,90	2,40	2,30	1,90	2,30
TER		5,10	5,80	5,70	5,00	5,70

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

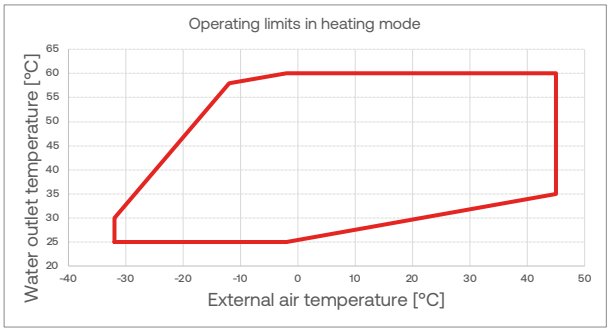
PH 7-9,5
Electrical conductivity ..... 100-700 µS/cm
Solphates SO_4 ..... < 100 mg/l
Bicarbonate HCO_3 ..... < 200 mg/l
Cloride Cl ..... < 50 mg/l
Phosphate PO_4 ..... < 2 mg/l
Carbon dioxide CO_2 ..... < 5 mg/l

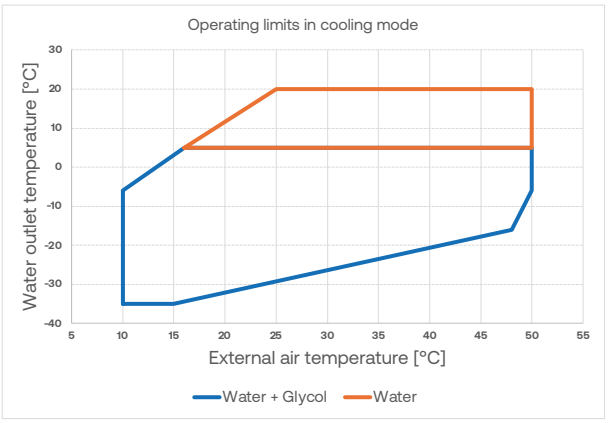
Oxigen O_2 ..... 5-10 mg/l
Nitrates ..... < 5 mg/l
Ammonia ..... None
Hydrogen sulfide H_2S ..... None
Chlorite ..... None
Free chlorine ..... < 0,2 mg/l

Recommended measures to Improve Water Quality:

- **Flushing the system:**
  Before starting the system for the first time, thoroughly flush it to remove any debris and reduce the risk of sludge and scale buildup.
- **Mechanical and magnetic filters:**
  Install mechanical and magnetic filters to capture particulates and magnetite, protecting the heat exchangers from contamination.
- **Automatic air vents:**
  Use automatic air vents to remove air from the system, minimizing oxygen content and reducing the risk of corrosion.
- **Corrosion inhibitors:**
  Apply chemical inhibitors to prevent corrosion, especially in systems with metallic components.
- **Regular maintenance:**
  Perform routine checks on water quality and filter conditions. Regularly clean or replace filters as needed to maintain system performance.

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 Δt = 5 K.

The maximum permissible flow rate is that with a thermal jump of Δt = 3 K. Lower thermal jump values may result in too high a pressure drop. The minimum permissible flow rate is that with a thermal jump of Δt = 8 K.

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

Chilled water temperature

The minimum permissible temperature at the outlet of the utility exchanger depends on the heating fluid used.

For water systems, lowest permitted temperature at the outlet is 5 °C.

For systems protected with antifreeze lowest permissible temperature that the heat pump can produce is -35 °C.

The user must ensure that heating fluid temperature is always higher than freezing point of the substance.

Freezing of the heating fluid in the system can cause permanent damage to the heat pump and it should be avoided at all cost.

See next page for relation between freezing point and percentage of glycol in the mixture of water and glycol..

The maximum water temperature produced is 20 °C.

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 60 °C. Otherwise, the action of the safety devices will stop the unit.

Outdoor temperature

The units operate in heating mode with an outdoor temperature between -32 °C and 45 °C.

They operate in chiller (cooling) mode with an outdoor temperature between 10 °C and 50 °C.

Correction factors

Operating limits

Glycol percentage	Freezing point (°C)	Capacity Correction Factor (CCF)	Input Power Correction Factor (IPCF)	Water Flow Correction Factor (WFCF)	Pressure Drop Correction Factor (PDCF)
10%	-3,6	0,986	1	1,02	1,06
20%	-8,7	0,980	0,995	1,054	1,114
30%	-15,3	0,973	0,990	1,092	1,190
40%	-23,5	0,966	0,985	1,140	1,244
50%	-35,5	0,960	0,975	1,200	1,310

- *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.*

Corrections for different ΔT and different fouling factors

Water temperature difference (°C)	3	5	8
Cooling Capacity Correction Factor (CCCP)	0,99	1,00	1,02
Input Power Correction Factor (IPCF)	0,99	1,00	1,01

Fouling factor	0,00005	0,0001	0,0002
Cooling Capacity Correction Factor (CCCP)	1,00	0,98	0,96
Input Power Correction Factor (IPCF)	1,00	0,99	0,99

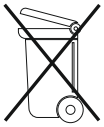
Safety Instructions for the User

- **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 smoke, using open flames or create sparks in the vicinity of the appliance.**
- **Electrical devices with ignition sources and mobile devices with batteries must be strictly avoided within the safety area.**
- **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.**

- **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



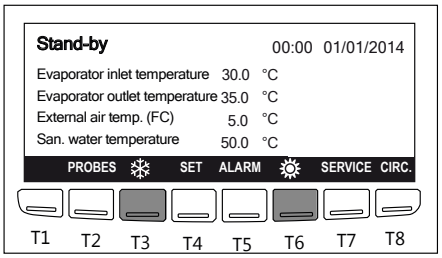
- *At the end of service life, the product should not be disposed of as solid urban waste, but should be handed over to a differentiated waste collection centre.*
- *Pay special attention not to discharge the compressor oil onto the ground or into sewers, waterways, groundwater or seawater.*
- *If the product contain the fluorinated greenhouse gases, they shall be recycled, reclaimed or destroyed according to the applicable local regulations and by qualified professionals*

When cleaning the appliance cabinet panels, do not use solvents or aggressive/abrasive cleaning agents. Wipe the surfaces using a soft clean cloth, water and soap.

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-19G-16.***

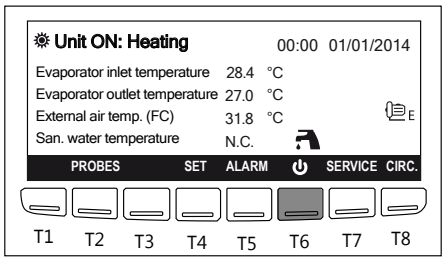
Turning On and Off



Depress:

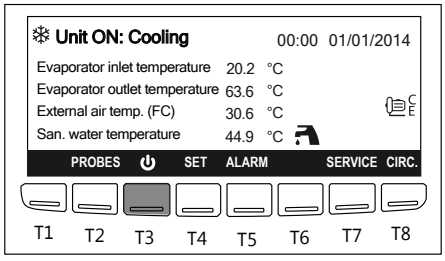
T6 ( ) to turn on in Heating mode

T3 ( ) to turn on in Cooling mode

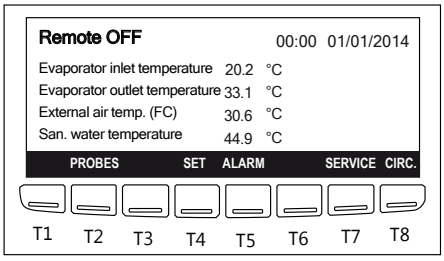


Depress:

T6 ( ) to turn off in Heating mode



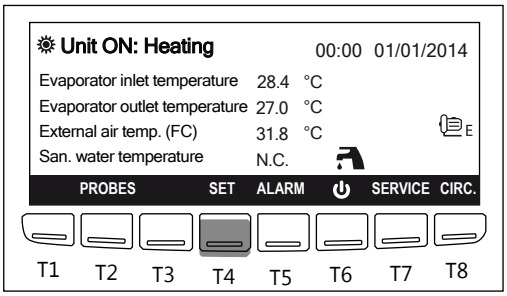
T3 ( ) to turn off in Cooling mode



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

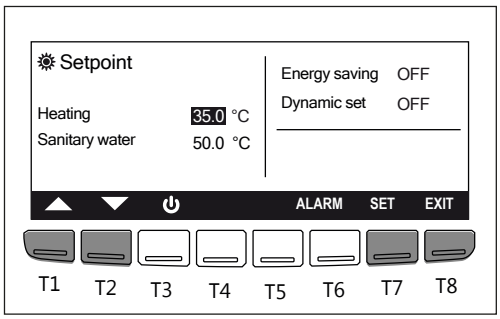
In this manual, screens displaying the heating functions are shown as an examples. Depending on the active and of the sensors and components installed in the system, the contents of the screens may differ. The principle of operation and navigation through the screens is however identical.

Definition of Setpoints - SET Function



Depress:

T4 (SET) to access **Setpoint** definition screen



Depress:

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

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

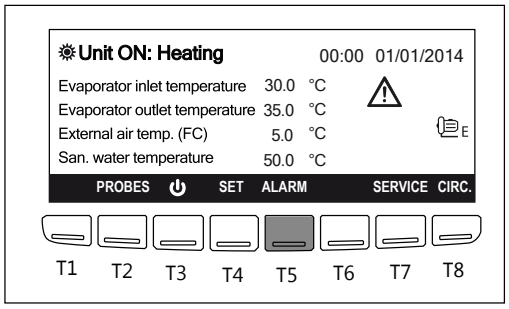
T1 (▲) / **T2** (▼) to increase/decrease the value.

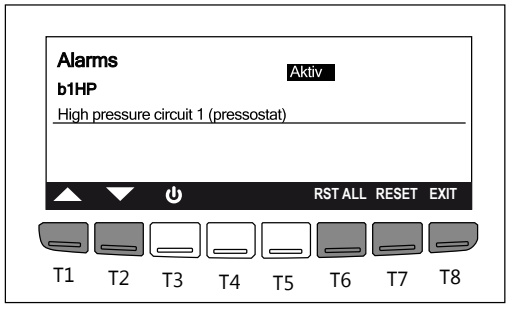
T7 (SET) to confirm the value.

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

Refer to ***"Setpoints" on page I-67*** 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

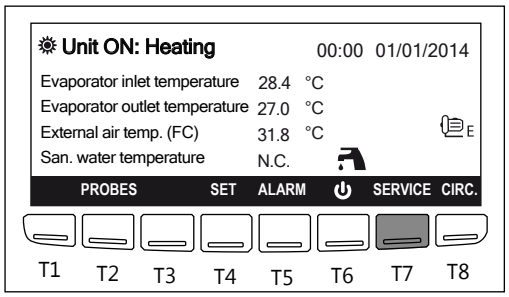
  T7 (RESET) to delete one alarm at a time

  T6 (RST ALL) to delete all the resettable alarms

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

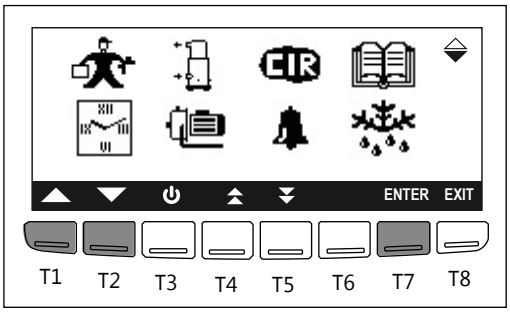
If an alarm buzzer is sounding, it can be stopped by pressing and releasing any of the keys.

Setting the Time and Date



Depress:

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

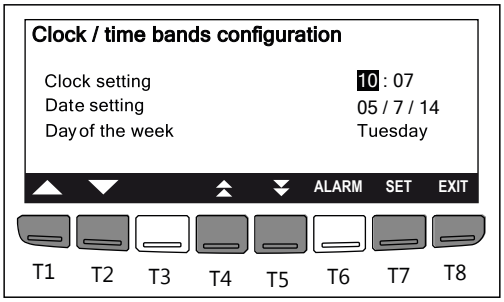


Depress:

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.

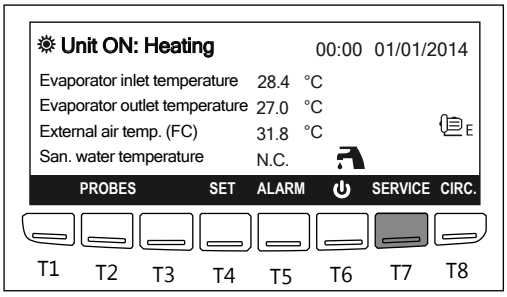
T1 (▲) / **T2** (▼) to increase/decrease the value.

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).

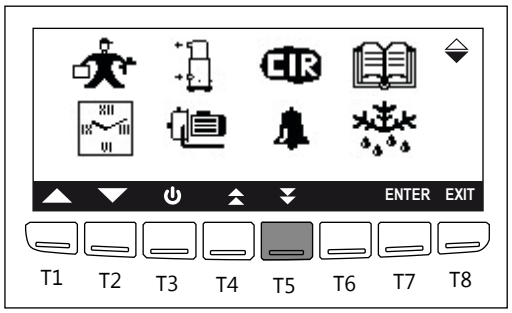
T8 (EXIT) to exit the menu

Control panel - Screen and Language Setup



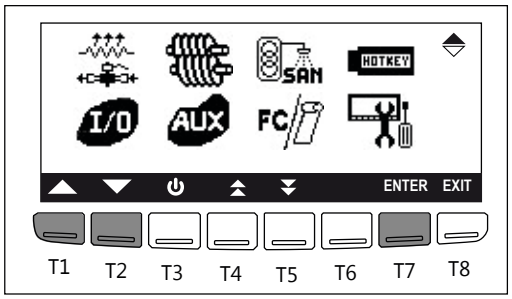
Depress:

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



Depress:

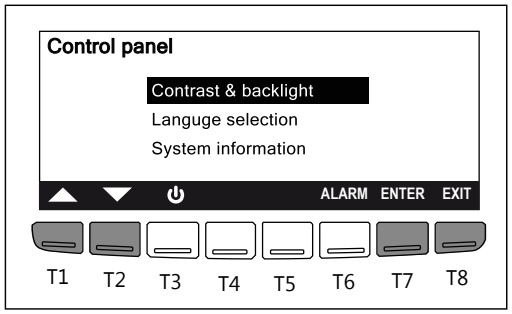
T5 ( ) to access the second screen of icons



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.
- Make sure to install all required external components to ensure the correct operation of the system.
- 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.
- The use of tools that generate sparks must be strictly avoided within the safety area.
- For systems using flammable refrigerant, there shall be no refrigerant leaks that will flow or stagnate.
- Make a complete check of the unit for possible refrigerant leakages due to bad transport conditions.
- Failure to comply with this requirement may result in a fire or explosion hazard in areas within the unit containing components and devices which may be a source of ignition.

- 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 discharged 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.
- 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.

Safety Instructions for Selecting the Location of Installation

- This unit operates with class A3 refrigerant, which is highly flammable and can cause an explosion.
- The installation MUST take place in locations not presenting any other explosion hazard areas, and if applicable, be subject to the rules and requirements for issuing a Fire Safety Certificate (or equivalent protocol in force in the country of installation) by the fire brigade (or equivalent authority in the country of installation).
- The installation MUST take place in environments that comply with local building regulations.
- The place of installation must comply with the following requirements:
  - Be for the exclusive use of the system.
  - Area not open to the general public but only to authorized persons, access is guaranteed. Authorized personnel shall be aware of the general safety precautions.
  - The installation area must be delimited and with access reserved for authorized personnel only.
- A safety distance shall be maintained around the machines, as required by national regulations.
- The unit MUST be installed in a safe location, exclusively outdoor, in an 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.

- In the defined safety area around the product, there must not be any:
  - Open flames;
  - Cavities, depressions, draining channels, wells, manholes, drains and the like if not siphoned;
  - Openings communicating with rooms with floors below the ground level;
  - Hopper light/window
  - Structures, buildings, real estate and constructions,
  - 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 installation of units below lower ground level is only permitted if a refrigerant leak sensor and automatic ventilation system are installed.
- If the elevation profile of the ground level is oblique with 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.
- It is very important to avoid recirculation phenomena between air inlet and air outlet, otherwise the performance of the unit will be degraded or normal operation will be interrupted. In this regard, it is necessary to ensure the minimum service clearances, refer to *"Clearances" on page G-24*.

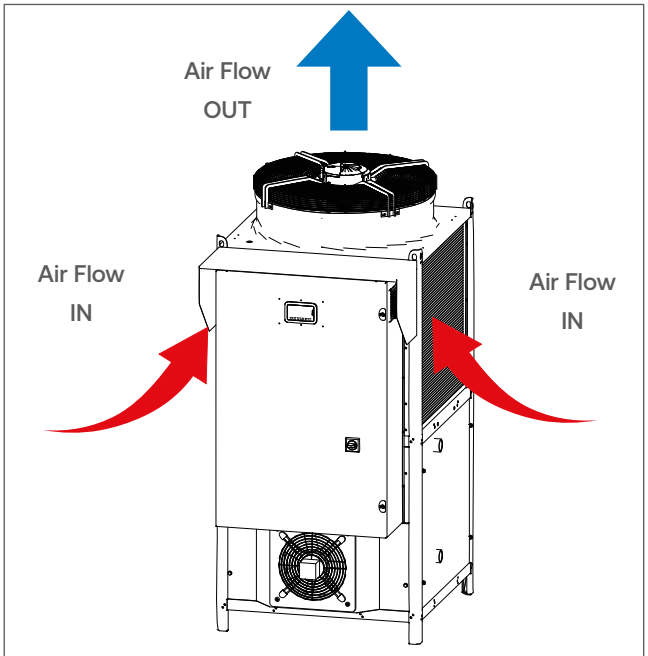
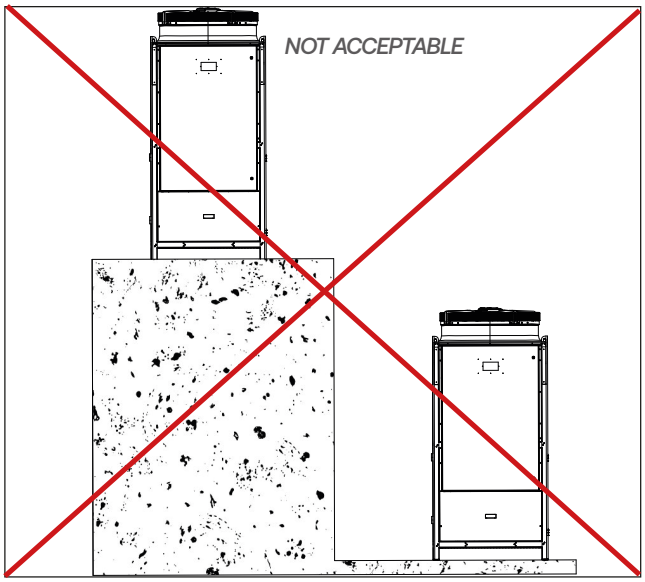


Fig. 7. Heat pump airflows

- *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 in Fig. 7.*
- *It is recommended to install anti-snow roof to prevent gathering snow on the unit. See Fig. 8*
- *The units, in their standard configuration, are not suitable for installation in saline environment.*
- *If the unit is installed in windy areas, where the wind speed is greater than 2,5 m/s (9km/h), in order to prevent malfunctions, 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*



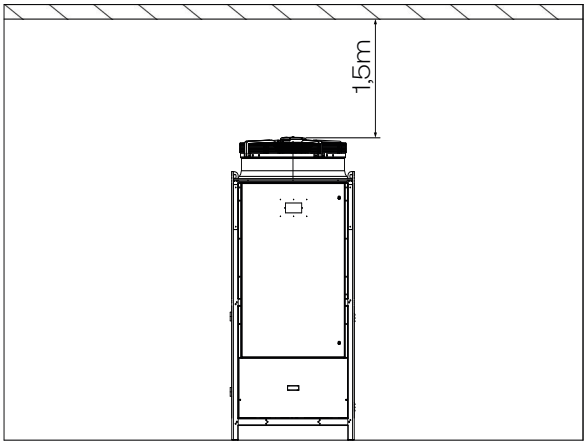


Fig. 8. Anti-Snow Roof

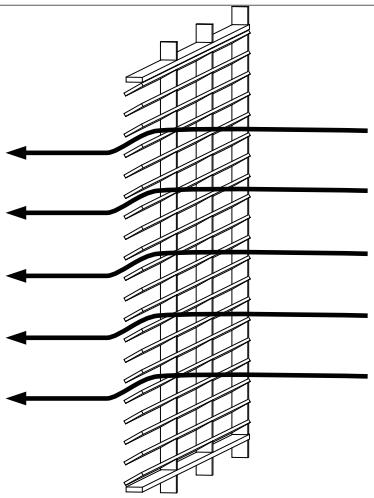


Fig. 9. Example of Wind Barrier

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.**
- **Gas is present in the appliance according to a minimum quantity prescribed by flammable gas regulations, but it necessarily requires greater precautions when handling the appliance.**
- **The refrigerant circuit must not be damaged to prevent leakage, as contact with the air of the gas itself means there is a risk of fire in the presence of a suitable ignition source such as an open flame or sparks caused by electrical equipment**
- **During both loading and unloading of the appliance, the load must always be lifted from the base of the product using a forklift truck or from the top using a crane. The lifting means shall have a capacity suitable for the weight to be borne. Do not overturn the unit or place it on its sides and subject it to violent shocks.**
- **The product is supplied with special protective packaging that only guarantees that it is protected from dust and any surface scratches; it is recommended that it be protected from the weather.**
- **Take all precautions in accordance with safety regulations to avoid possible damage to persons or property.**

- **Units can be lifted with a forklift or a crane.**
- **If using a crane, make sure to use a sling bar or spreader bar system with ropes or straps of adequate capacity (Do not use chains). Guards should be placed between the belt and the machine to prevent damage to the structure.**
- **During the handling, keep the unit vertical and the load balanced at all time to avoid a fall and 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.**

The appliance can be stored in its intact packaging for a long time. It shall be stored in a dry place, protected from the rain and humidity, as well as from the sun and at a temperature between +2 °C and +45 °C.

Safety requirements :

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

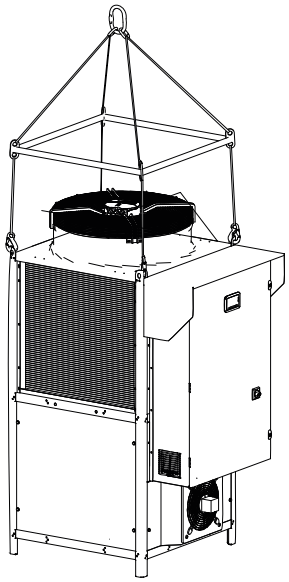


Fig. 10. Handling the unit

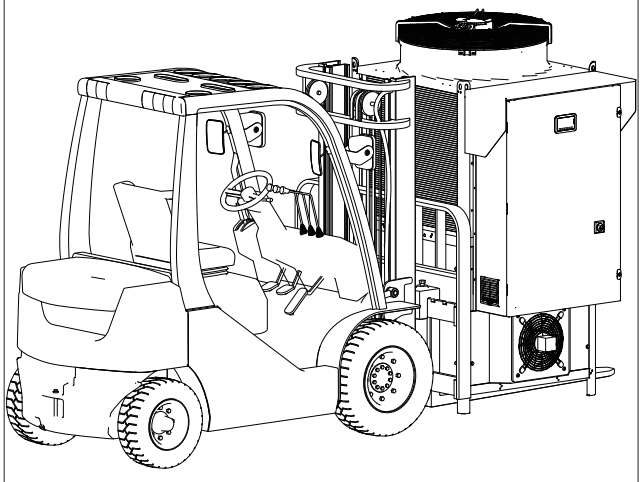


Fig. 11. Transporting the unit

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.

Installing and Preparing the Unit

The units transmit a low level of vibration to the ground; therefore, it is advisable to install anti-vibration dampers between the base frame and the ground.

Installing Anti-vibration Dampers (optional)

Safety requirements :

Tools and materials:

- Bubble level
- Adjustable wrench

1. Before lowering the unit to the ground, install interfacing anti-vibration dampers to the feet of the unit..
2. Once the unit is on the ground, ensure that the unit is level.
3. Adjust feet height if required.

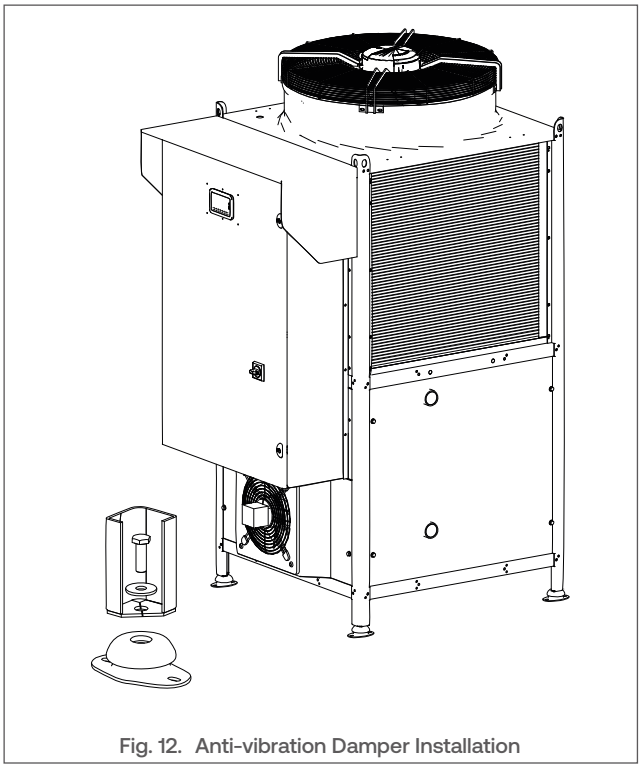


Fig. 12. Anti-vibration Damper Installation

Condensate Tray Antifreeze Protection

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.

Opening and Closing the Panels

Conditions: OFF

Tools and Material:

- Key supplied with the heat pump
- Wrench, flat, size 10

Removal Procedure:

Top Front door(s) and Controller Door

To be able to open the top door, make sure that the emergency power switch is set to OFF.

1. Using a key, rotate the lock (**1**) .
2. Open the door on its hinges.
3. Perform procedure in reverse order to close the door(s).

Side and Rear Access panels

1. Using a wrench, remove four hex head screws (**2**) around the access panel. Retain for reinstallation.
2. Lift the access panel using the built-in handle (**3**) and set aside.
3. Perform procedure in reverse order to close the panel.

Follow-on Task(s):

None

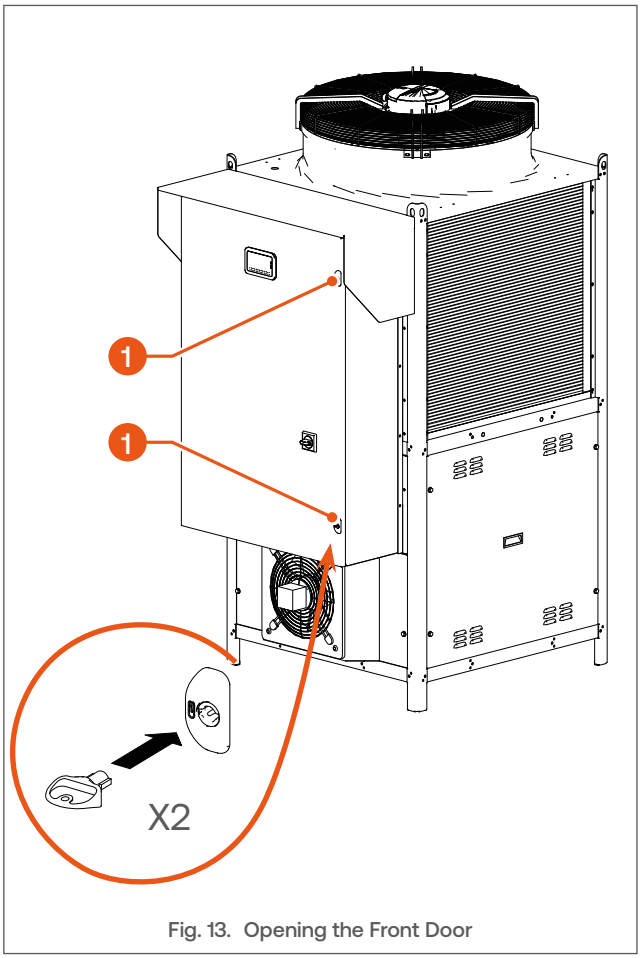


Fig. 13. Opening the Front Door

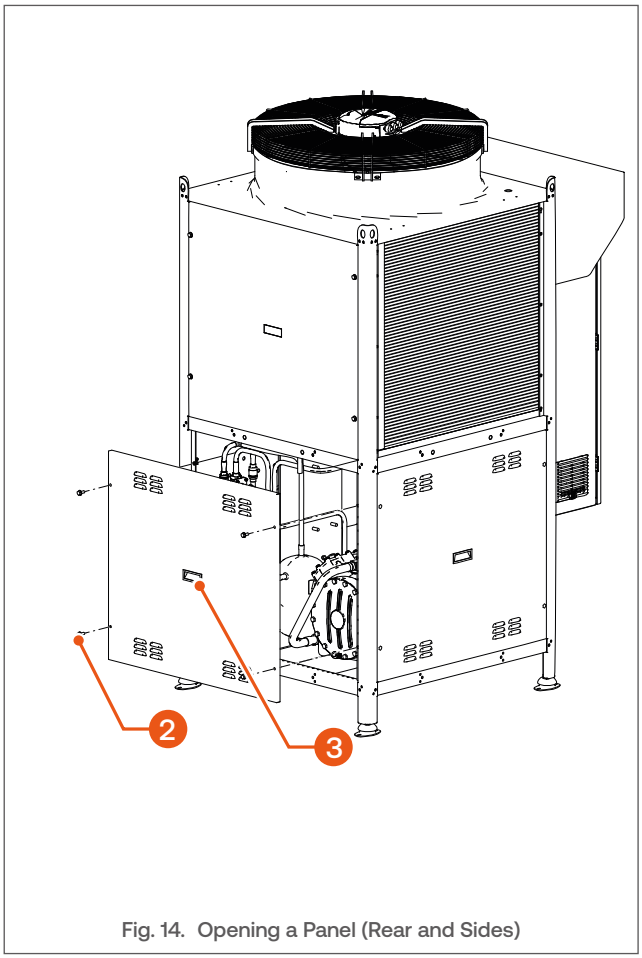


Fig. 14. Opening a Panel (Rear and Sides)

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 pressure is higher than 6 bar, the system will be protected by a water safety valve set to 6 bar.**
- **Verify the water quality of the network according to the requirements defined in this manual.**
- **In case 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.**
- **Depending on the type of unit and the defined setpoint, the temperature of the hot water produced in a DHW circuit can reach 60 °C and cause scalding when drawn from a tap. The installation of a thermostatic mixing valve is therefore recommended.**

- **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 must be protected by a water safety valve set to 6 bar.**

- **Flush thoroughly the circuit before operation.**
- **DHW circuit piping should be made from copper or galvanized steel.**

- *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.*

Requirements for the Hydraulic Connections

- **Install water pipes in accordance with national and local regulations.**
- **Design the pipework to meet the nominal water flow and hydraulic pressure drops of the system. The maximum pressure drop is typically 300 Pa/m.**
- **Insulate all pipes with closed-cell material of adequate thickness.**
- **Connect the unit to the system using appropriate anti-vibration connections to prevent damage to the pipework caused by the vibrations of the unit.**
- **Make sure the water return system fits into the connection labelled: "WATER INLET".**
- **Install a water filter, with a metal mesh 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". See** *"Flow Switch Installation" on page I-45*

To lengthen the life of the unit and hydraulic circuits, the following equipment should be installed:

- 2 pressure gauges of appropriate scale (on inlet and outlet),
- 2 shut-off valves (on inlet and outlet),
- 2 anti-vibration connections (on inlet and outlet),
- 2 thermometers (on inlet and outlet),
- 2 air vents ((on inlet and outlet),
- a Y filter on the inlet only (See ***Fig. 15*** for the correct position of installation)
- A flow switch on the inlet (delivered with the unit)

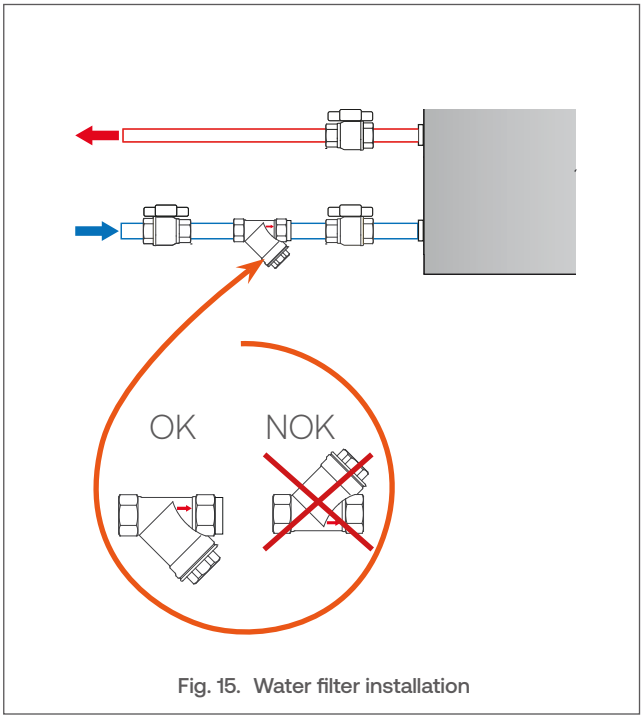


Fig. 15. Water filter installation

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

Flow Switch Installation

Conditions: 

Safety requirements: 

Tools and Material:

- 2 nylon gaskets
- 2x adjustable wrenches
- Sealing material (hemp and sealing paste or teflon tape)

All units are supplied with a paddle flow switch mounted on a tee connection, which should be installed on the heat pump return connection, labelled 'Water inlet". Refer to "Safety Instructions Before Start-up" on page I-56

Procedure:

To prevent any fluctuations in the flow, 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. It is therefore recommended to install a straight section of pipe.

1. Install a straight section of pipe (**1**) upstream of the flow switch (**2**), with a minimum length of 5 times the internal diameter of the pipe.
2. Seal the thread with suitable sealing material (e. g. hemp or Teflon tape).
3. Screw the flow switch and tee connection assembly (**2**) to the pipeline. Make sure that the arrow (**3**) indicating flow direction on the top of the flow switch is pointing towards the heat pump.
4. Route the flow switch wires (**4**) through the cable gland (**5**) labelled "FLOW SWITCH" and connect to the dedicated terminals (**6**) inside the heat pump:
   - Strip a piece of insulation from the wire ends to ensure a good electrical connection inside the terminal block.
   - Lift the terminal block levers upwards and insert each stripped wire end into a terminal of the block (**6**).

Wires can be connected indifferently to the terminals.

   - Lower the terminal block levers to secure the wires. Check visually that the connection is secure. Also refer to ***"EXTERNAL WATER FLOW SWITCH (dry contact)." on page I-51*** for more information regarding the electrical connection.

Follow-on Task(s):

1. Start the appliance as required. Refer to ***"Start-up and Commissioning" on page I-58.***
2. Check that there are no leaks. If required, seal the pipeline and tee connections.

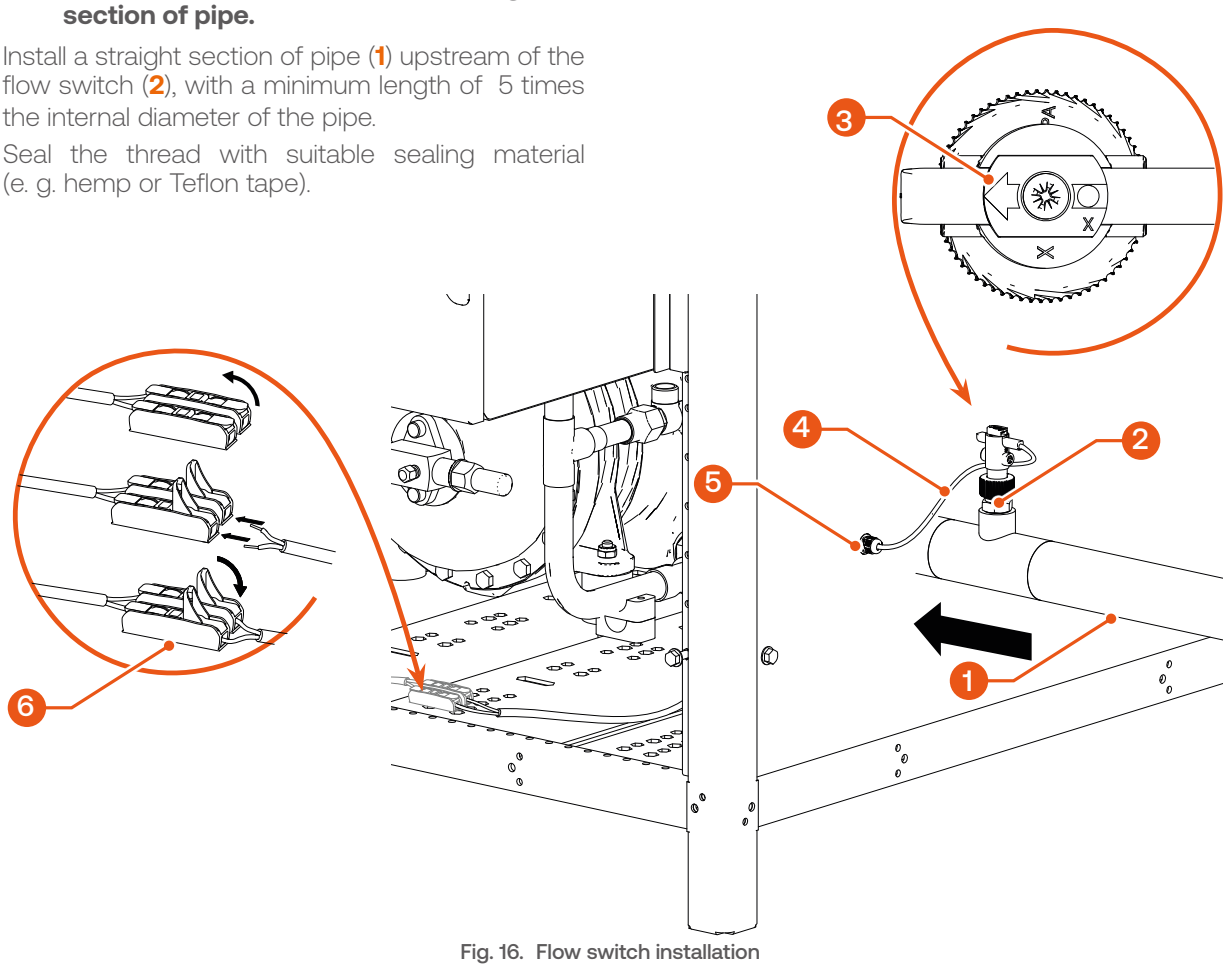


Fig. 16. Flow switch installation

Typical Hydraulic Connections - Primary

Pipelines must be carefully sized according to the nominal water flow rate of the unit 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 *"Single pump kit for heating/cooling" on page G-13*

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

The unit must be connected to the pipeline using appropriate anti-vibration connections to avoid damage to the pipework caused by vibration of the unit.

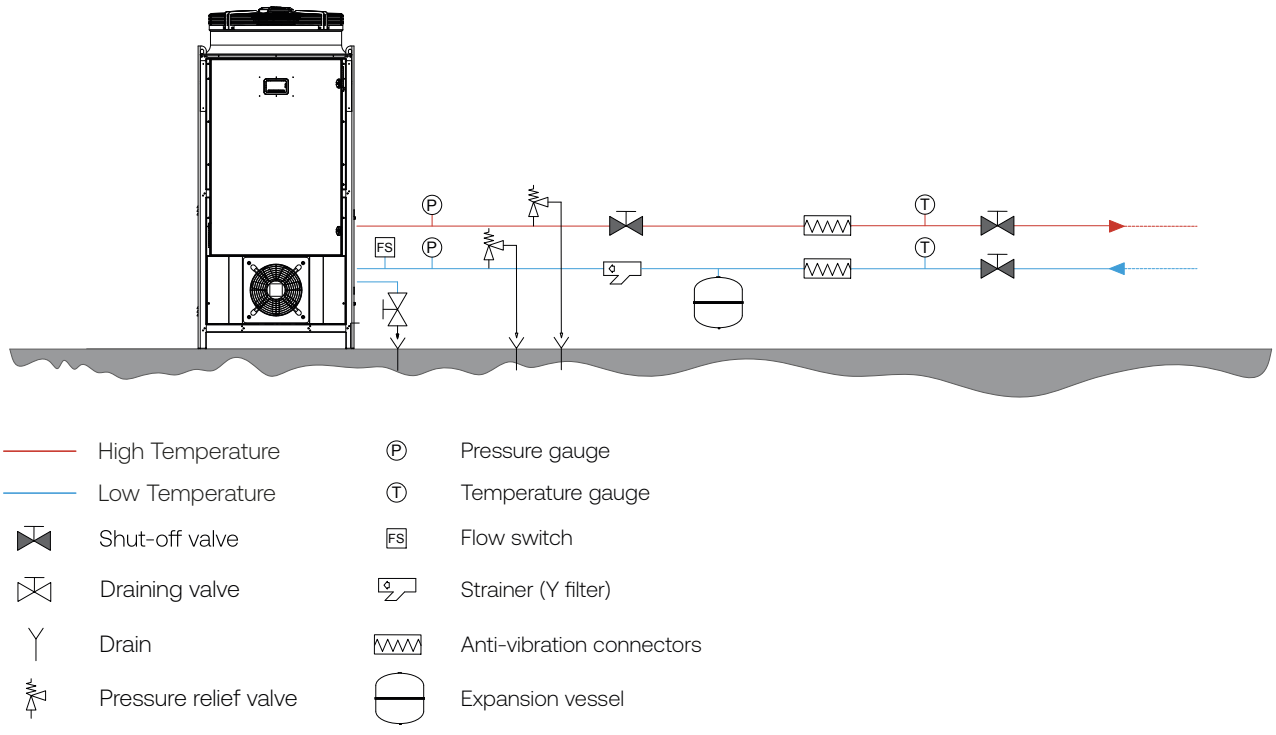


Fig. 17. Primary Circuit Components

System for the Production of DHW / Heating / Cooling

2 - Pipe system

The system uses water stored in the accumulation (AC) buffer tank and DHW Tank. 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.

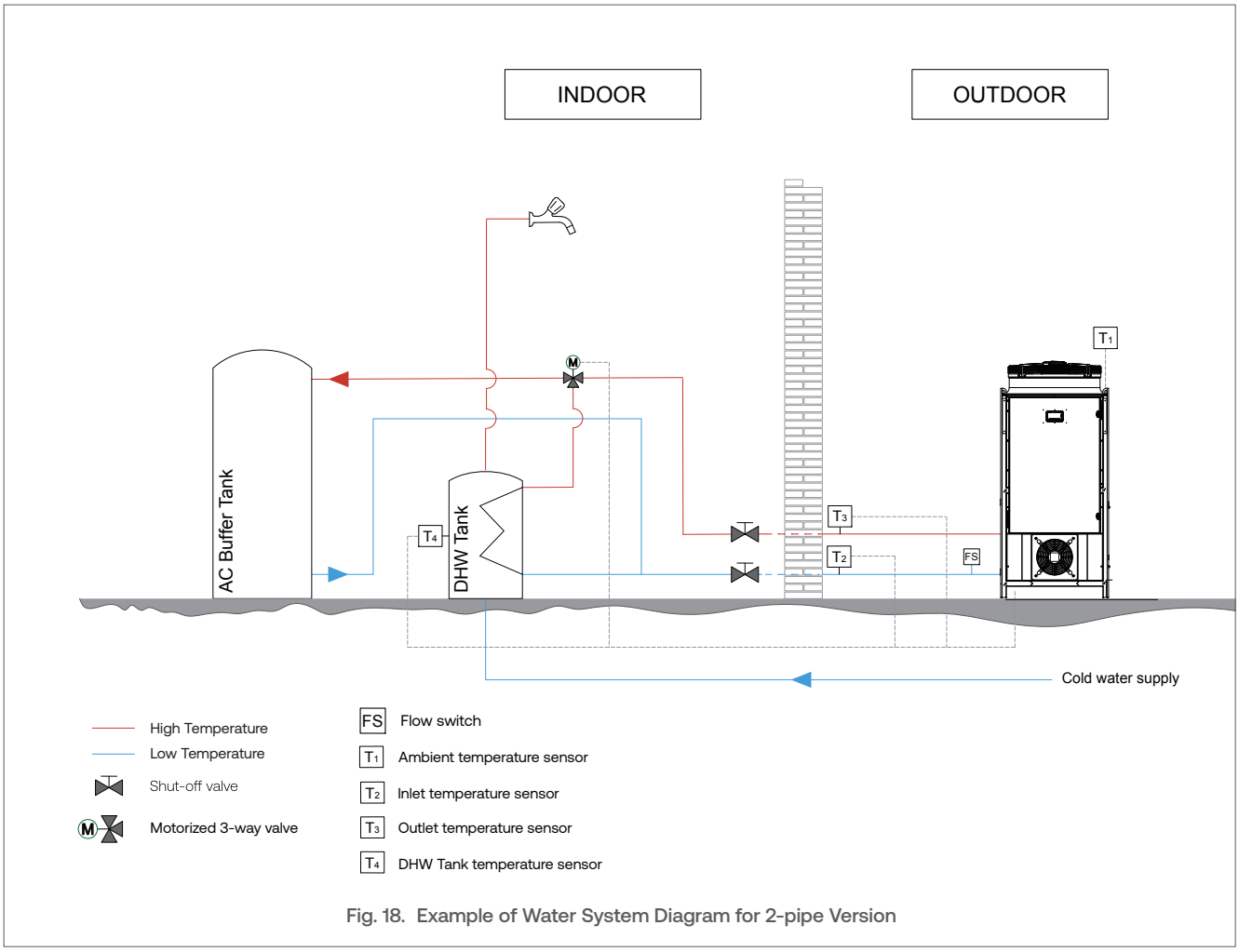


Fig. 18. Example of Water System Diagram for 2-pipe Version

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

.

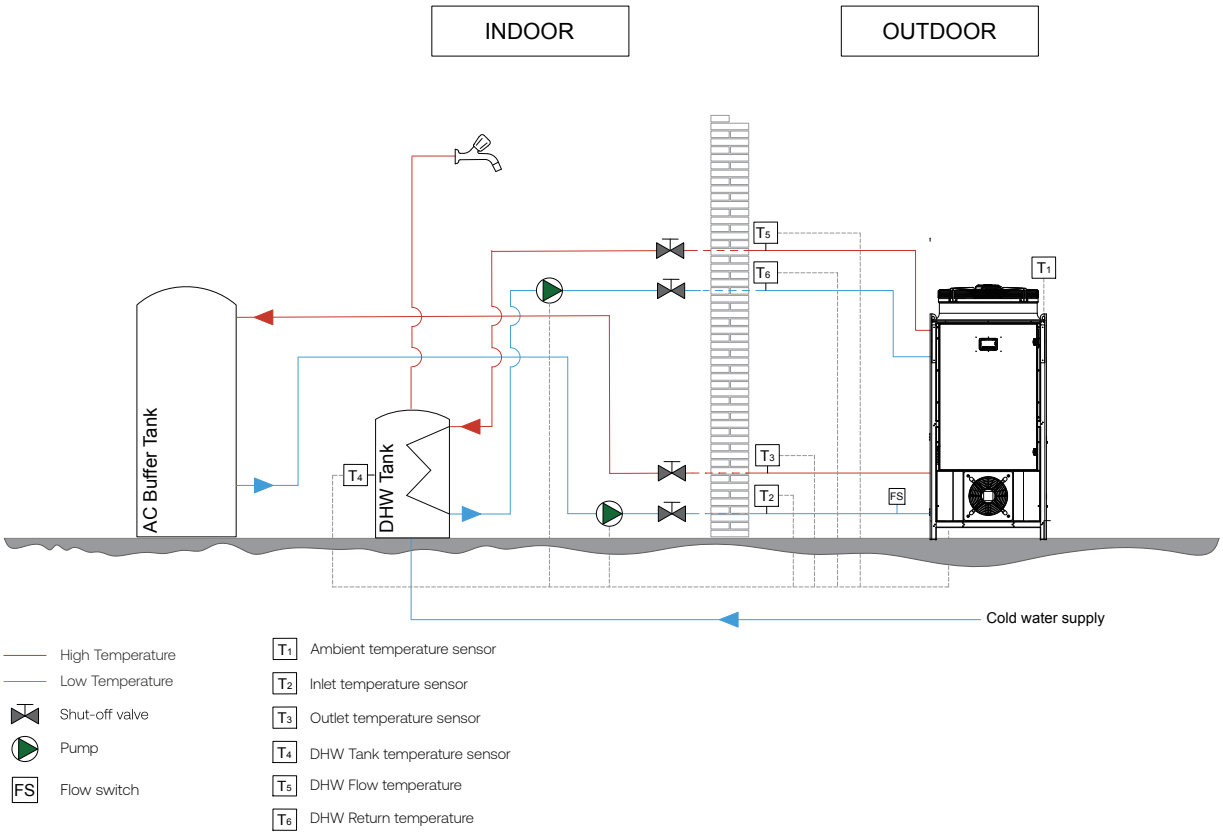


Fig. 19. Example of Water System Diagram for 4-pipe Version

The heat pump has to be connected to the hot water 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 hot water buffer tank.

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.

- **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.**

Electrical Connections

Check ***Fig. 20*** and ***Fig. 21*** for a detail of the electrical components present in the electric box. Also refer to the wiring diagram provided with the unit.

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

Connect optional equipment to the terminal block. Refer to the wiring diagram provided with the unit and to "Terminal block connections" on page I-51.

Power supply connection

1. The high Voltage wiring is connected to a main switch (**7**).
2. Grounding PE connection - located next to the Main switch (**7**).

LEGEND

1. Circuit breakers
2. Fuses
3. 230V socket
4. Relay
5. Controllers
6. Terminal strip
7. Main switch and grounding strip
8. Inverter
9. Ventilation grid with filter

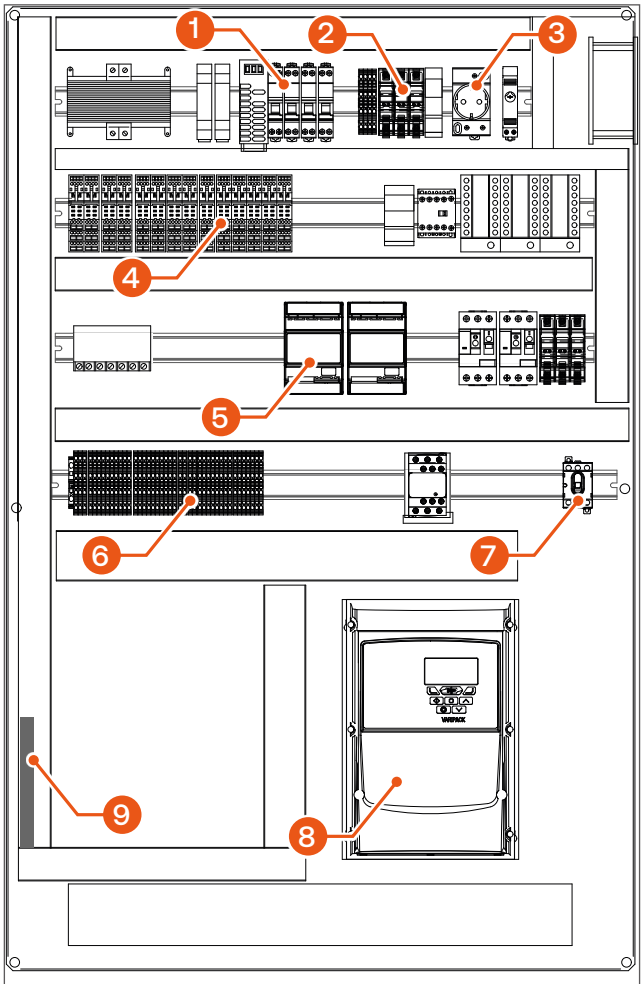


Fig. 20. Electrical Components - Aurax Natural i 29.1 to 56.1

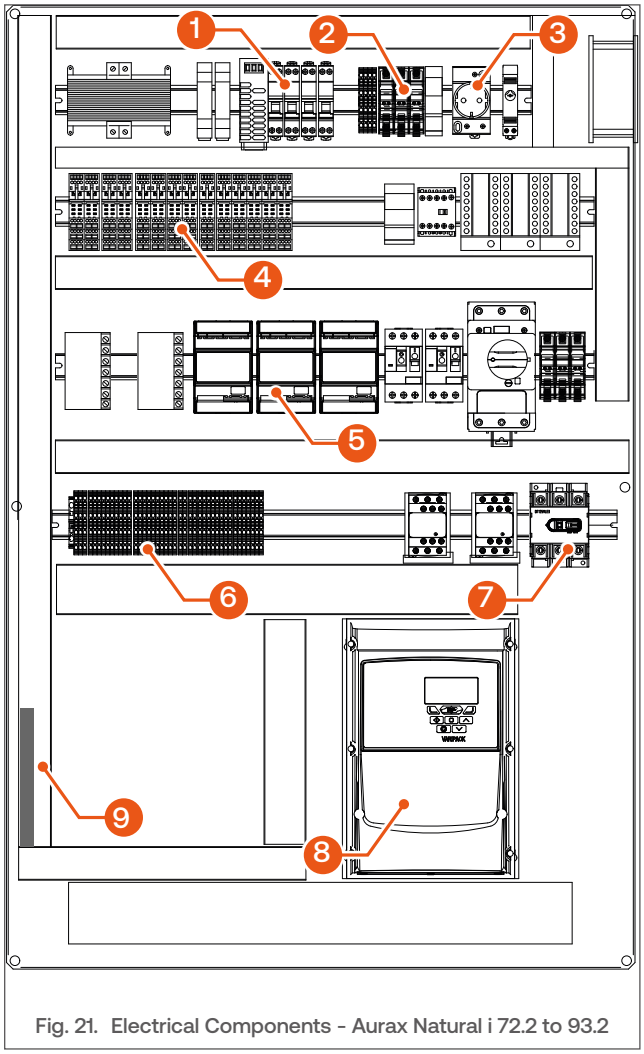


Fig. 21. Electrical Components - Aurax Natural i 72.2 to 93.2

LEGEND

1. Circuit breakers
2. Fuses
3. 230V socket
4. Relay
5. Controllers
6. Terminal strip
7. Main switch and grounding strip
8. Inverter
9. Ventilation grid with filter

Connecting Optional Equipment

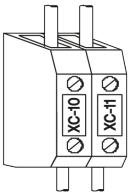
All the units are equipped with a controller that can be connected to BMS remote control system using the Modbus protocol.

For information on the number of terminals required to connect the BMS control system, refer to the wiring diagram supplied to the unit.

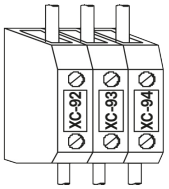
Signal or control wires (dry contact) must be electrically separated from power cables.

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

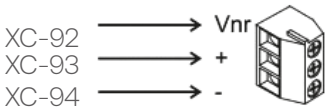
Terminal block connections

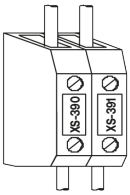


REMOTE ON/OFF (dry contact)
Terminals : XC-10 / XC-11.
Closed contact: unit ON.
Open contact: unit OFF.

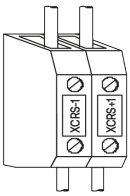


REMOTE Display connection
Terminals : XC-92 / XC-93/ XC-94.
Cable type: 3x1 mm² shielded





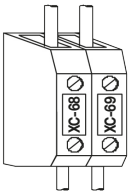
AMBIENT air temperature (signal)
Terminals : XC-390 / XC-391.
Sensor type: NTC 10 kΩ



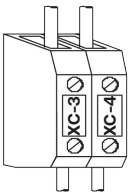
RS485 Connection (signal)

Terminals: XCRS-1 / XCRS+1

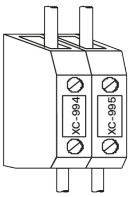
Cable type: 2x0,75 mm² twisted pair



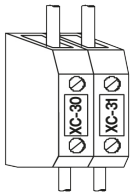
REMOTE SUMMER/WINTER SWITCHING (dry contact).
To use a summer/winter remote switching device, the jumper must be replaced with a switch connected to terminals XC-68 / XC-69.
Closed contact: unit in WINTER.
Open contact: unit in SUMMER.



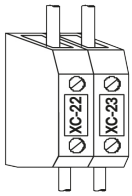
EXTERNAL WATER FLOW SWITCH (dry contact).
To connect the external paddle flow switch contact, the jumper must be replaced with the contact at terminals XC-3 / XC-4.
Closed contact: flow not present.
Contact open: flow present.



CONTACT ENABLING DOMESTIC WATER ONLY (dry contact).
Terminals: XC994 / XC995.
Closed contact: enable.

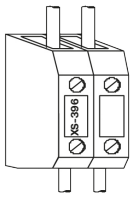


REMOTE GENERAL ALARM (dry contact)
For remote signaling of a general alarm, connect an audible or visual device between terminals XC-30 / XC-31.
Contact closed: unit in alarm.



DOMESTIC HOT WATER PUMP (230V/2A)

Terminals: XC-22 / XC-23.



DOMESTIC HOT WATER TANK
Terminals: XS-396 / XS-397.
Sensor type: NTC 10 kΩ

The numbering of terminals may change without notice. Please always refer to the wiring diagram supplied 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 mm^2 and maximum length 200m.

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

Installing a Remote Control Panel (option)

- **Special care must be taken when connecting the remote control panel 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 control panel is used, disconnect the built-in control panel.**

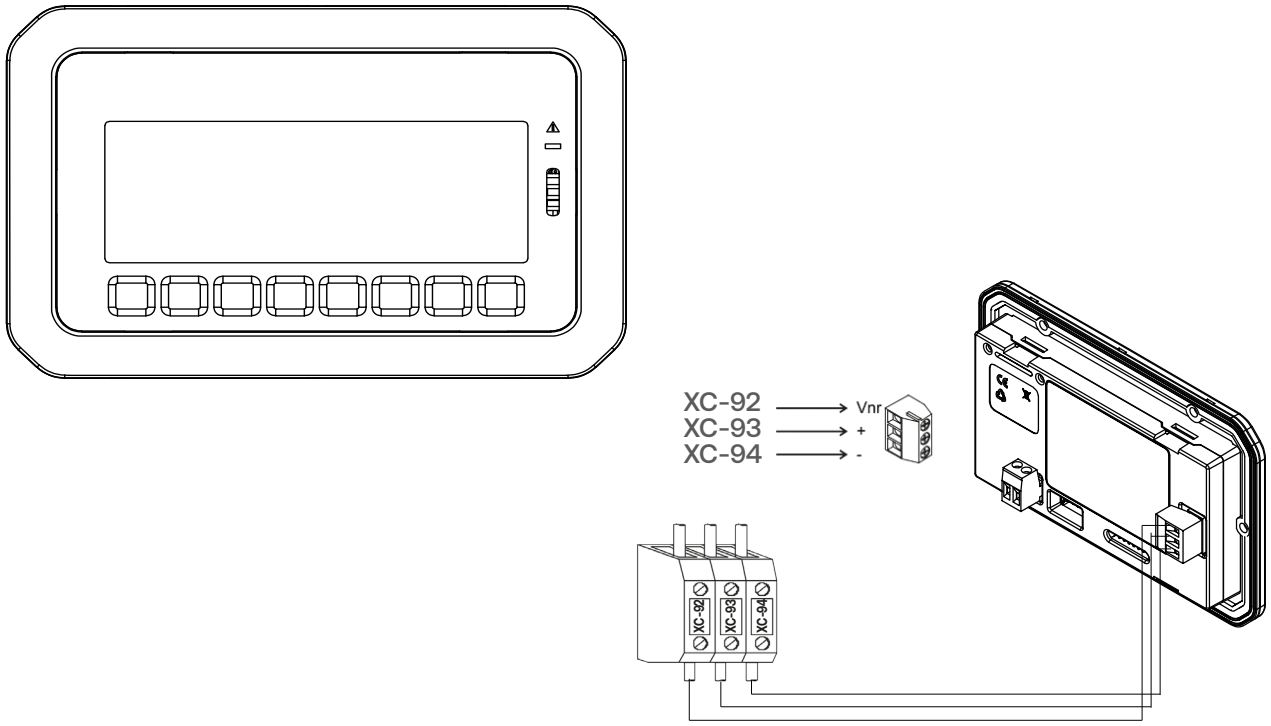


Fig. 22. Control Panel Connection to the Electronic Board

The complete wiring diagram is provided with the unit.

Refrigerant Circuit Layout

2-Pipe system

This version uses 2 hydraulic connections and is capable of producing hot water in winter, cold water in summer and domestic hot water all year round when connected to an external 3-way valve. The 3-way valve is not supplied with the pump.

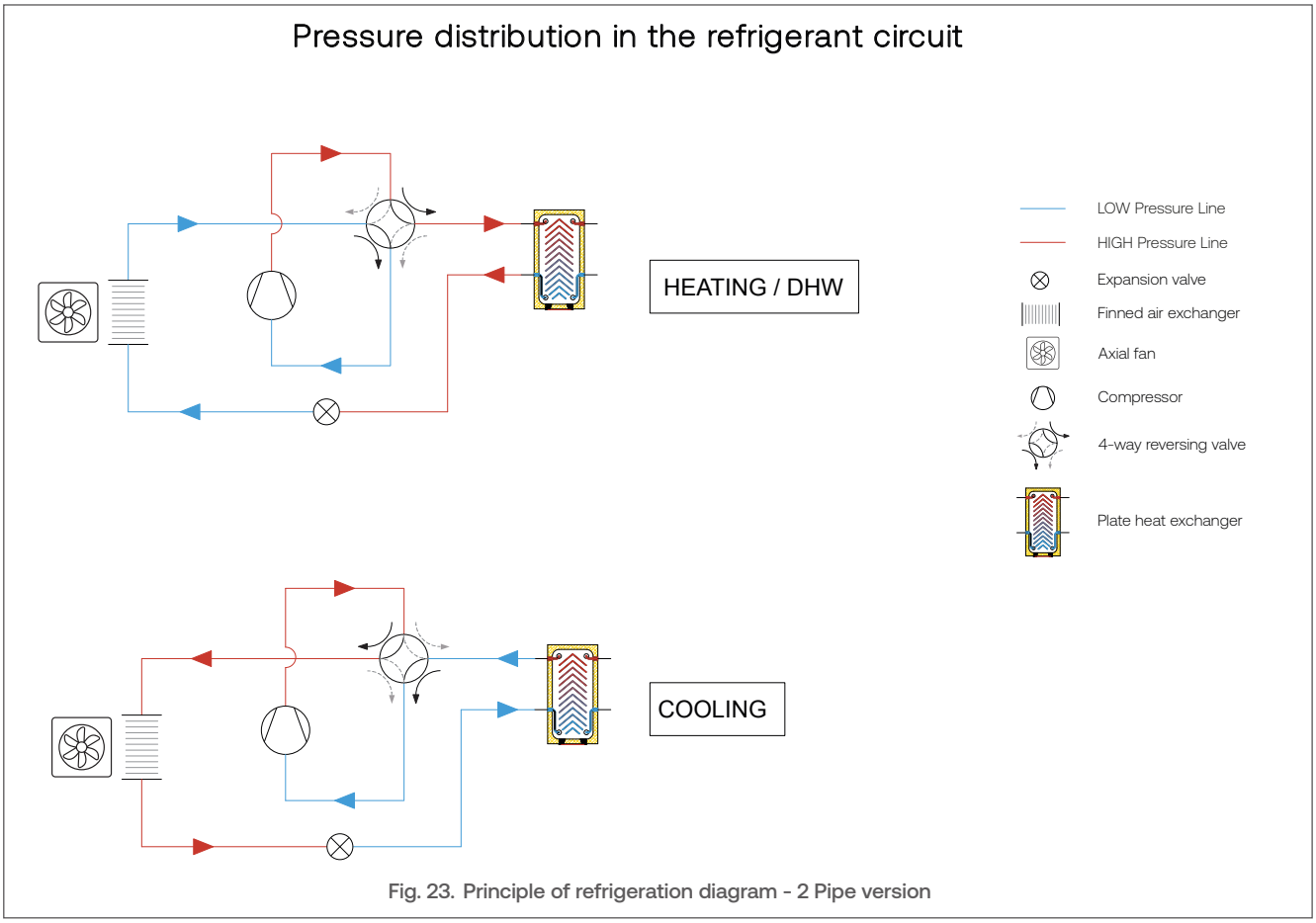


Fig. 23. Principle of refrigeration diagram - 2 Pipe version

4 Pipe system

This version uses 4 hydraulic connections and is able to produce hot water in winter, cold water in summer and domestic hot water all year round. The system has 2 additional connections for domestic hot water circulation (an external 3-way valve is not required).

An additional plate exchanger is placed in the cooling circuit, which allows the heat generated by the cooling process to be used for DHW production rather than be dissipated into the air..

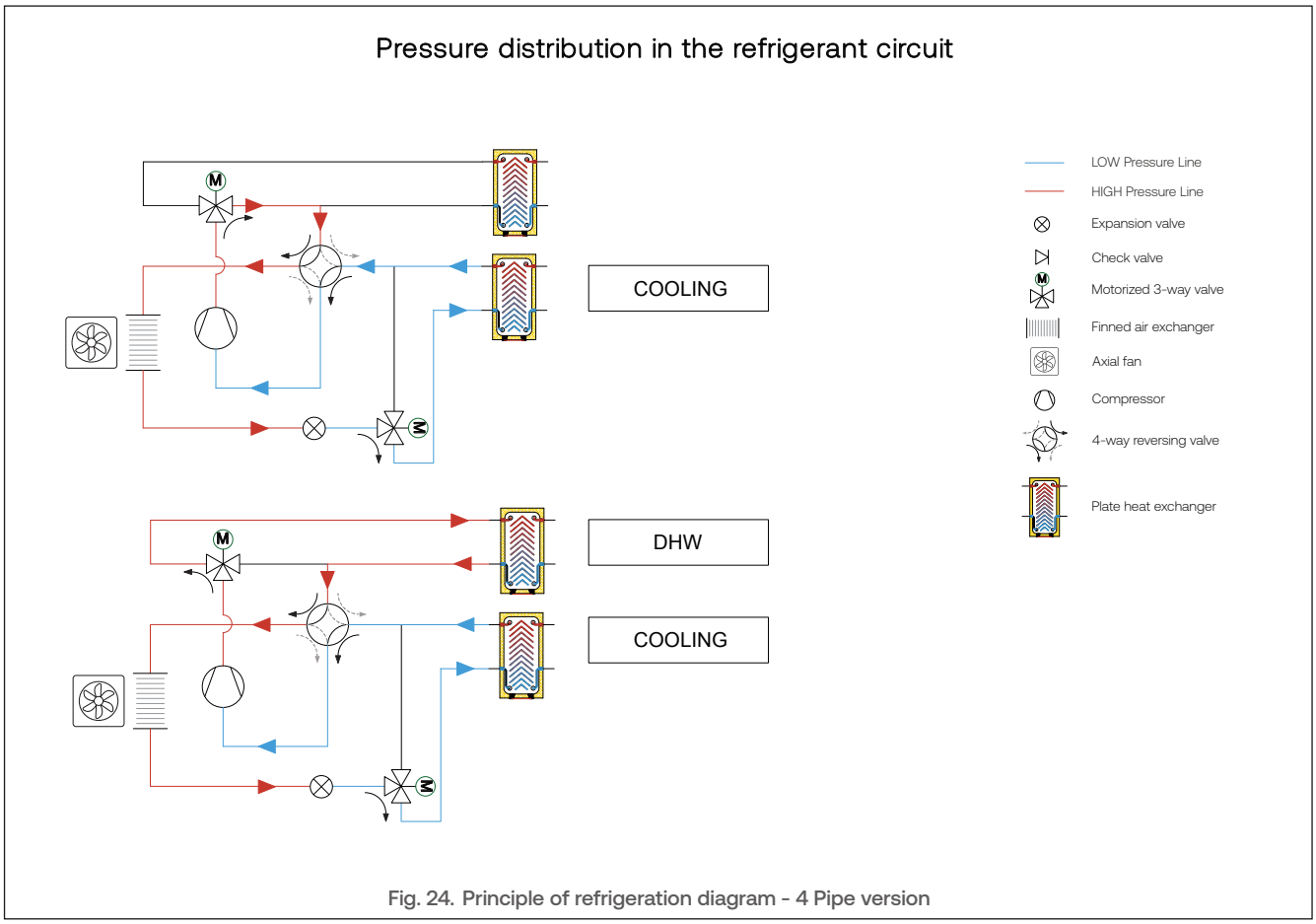


Fig. 24. Principle of refrigeration diagram - 4 Pipe version

Safety Instructions Before Start-up

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

- **Make sure that the unit is connected to electrical power supply at least 24 hours before starting it up to allow the heaters to heat up the compressor crankcase.**
- **Before starting the unit, check that the hydraulic circuits are full of water and that the unit is supplied with electrical power.**
- **The flow switch MUST be installed to the piping and electrically connected to the heat pump.**
- **Check that there is no refrigerant leakage.**
- **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.**

Filling the System

Conditions: 

Procedure:

1. Connect water supply to the filling valve.
2. Open all manual air vents in the system.
3. Open all shut off valves and ensure that the system is open to one volume.
4. Slowly open the filling valve and water supply circuit shut-off valve.
5. Keep filling until water starts coming out of the air vents.
6. Close the air vents, and continue filling until the pressure gauge indicates 1,5 bars.

When the water is cold the pressure should be between 1,5 and 3 bar. If the pressure in the system exceeds 3 bar, stop filling let some water out through the drain connection, to bring the pressure down between 1,5 and 3 bar.

7. Once the whole system is full of water and at the correct pressure, close the filling valve and disconnect water supply.

Follow-on Task(s): None

Start-up and Commissioning

Keep the unit electrically powered for at least 24 hours before start-up to ensure that the heaters heat up the crankcase.

Conditions:

- All initial checks have been carried out. Refer to *"Installing and Preparing the Unit" on page I-41*.

Safety requirements:

Caution :

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) in 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 in the buffer tank before turning on the building heating load pumps. When the heat pump turns off because it has reached the setpoint in the buffer, it is safe to start using the buffer for building load and the unit can be left in automatic mode.**
- **In case of separation of the primary circuit (heat pump to buffer tank) and the secondary circuit (buffer tank to building) keep both of the secondary circuit pump and the user system side shut-off valves closed.**
- **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 ***"Operation Modes" on page I-67*** for more information on the available modes.
5. Perform the setup of the system as required. Refer to ***"Setpoints" on page I-67***.
6. Check the operation of the compressors and fans by measuring the electric consumption of each component.
7. Open the rear panel to access the pressure and temperature gauges of the high-pressure and low-pressure service ports. Refer to ***"Opening and Closing the Panels" on page I-42***.
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.

Make sure to clean the water filter regularly.

Follow-on Task(s):

Close panel, refer to *"Opening and Closing the Panels" on page I-42*.

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 AIC Technical Support.

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"*. 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 are strictly forbidden.
- During work on the refrigerant circuit, ensure the area is well-ventilated; 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 (if any) 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.

General Maintenance Tasks

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 replacement due to wear or in case the machine has not been operating for more than two years. Replace all the components that are no longer fit for use. Do not carry out tests at a pressure higher than the one indicated in the procedure.	X	X	X
Repair, or significant adjustments of the system, or its components. The check may be limited to the parts involved, but if a refrigerant leakage is detected, a leak test must be carried out on the whole system.	X	X	X
Leak test, following a 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 *"Leak Test of the Refrigerant Circuit" on page I-64*.	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 levels of the unit			X
Check operation of safety features and interblocks			X
Check the unit 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 fan electrical connections			X
Check the 3-way valve operation (if present)			X
Check the colour of moisture indicator on refrigerant liquid line			X
Check for refrigerant leak. Repair if required			X
Check the liquid solenoid coils (refer to Troubleshooting)			X

*** 30 days after start-up**

Safety requirements: 

Tasks	Months		Years
	1*	6	1
Compressors			
Visually inspect the compressors			X
Check the supply voltage of the compressors			X
Check the compressor 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 compressor 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**

**** If any**

Safety requirements: 

Tasks	Months	Years
	6	1
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
Clean the fan filter in electrical cabinet (See ***Fig. 20 on page I-49 and Fig. 21 on page I-50)***		X
Cleaning of a unit area		X

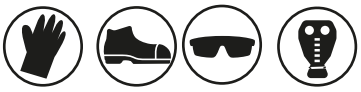
*** If configured**

Safety requirements for Repairs 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 occurs.**
- **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.**

- **Make sure that the following measures are implemented:**
  - **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.**

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 Refrigerant" on page I-63.*
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 braze 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

Discharging 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 G-10***
- **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 :

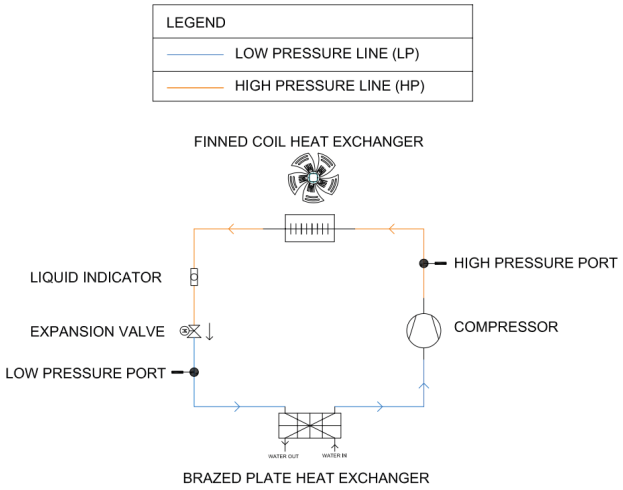
Conditions: OFF

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 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.
4. With the refrigerant tank, and the heat pump connectors closed, open the manifold gauge inlet up to refrigerant tank.
5. Turn on the vacuum pump allowing air and moisture to leave hoses and the equipment.
6. After 15 minutes, close the valve of the manifold and turn off the vacuum pump.
7. Open the refrigerant tank and heat pump high and low ports.
8. 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.
9. 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.
10. Once recovery is complete turn the knob on the recovery station to “purge” and operate it to ensure the recovery station is empty.
11. Close the refrigerant tank and safely disconnect the charging equipment from the unit.



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.***

Leak Test of the Refrigerant Circuit

Before starting this test, discharge the refrigerant from the circuit. Refer to "Discharging Refrigerant" on page I-63.

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, up to a pressure of 2 MPa.
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 refrigerant is required, refer to *"Charging Refrigerant" on page I-65*

- **Perform any repair required 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 circuit.**
- **Repeat the leak test of the refrigerant circuit.**
- **Charge refrigerant in the circuit. Refer to *"Charging Refrigerant" on page I-65*.**

Charging Refrigerant

Safety requirements:

Caution :

Conditions: OFF

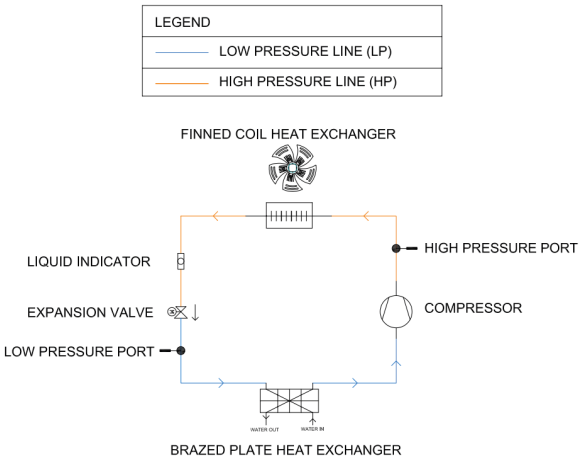
Before charging refrigerant, make sure that a leak test with nitrogen gas has been performed and that the refrigerant circuit is tight. Otherwise, refer to *"Leak Test of the Refrigerant Circuit" on page I-64*.

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, close the valve of the manifold and turn off the vacuum pump.
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

Draining Oil from the Compressor

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 of the oil, refer to *"Disposal of the Product at the End of Service Life" on page G-32*..

As a first step, 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.

Decommissioning

The decommissioning of the unit and its components must be carried out by a qualified professionals. The refrigerant charge shall be removed before decommissioning. Refer to *"Discharging Refrigerant" on page I-63*.

Safety requirements: 

Caution : 

Conditions: 

Tools and material:

- Nitrogen gas tank,
- Label with note “Refrigerant R290 removed”.

Procedure:

1. Discharge refrigerant according to ***"Discharging Refrigerant" on page I-63***.
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):

Dispose of the product. Refer to ***"Disposal of the Product at the End of Service Life" on page G-32***

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

Default Values

Device		Set-point	Differ-ential	Reset
Heating mode	°C	60	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
Low pressure switch	Bar	0,1	0,9	x3 times (then manual)

Setpoints

Function		Adjustment limit	Default value
Heating set-point	°C	25-60	60
Domestic hot water set-point	°C	25-60	60
Cooling set-point	°C	-35-20	7
Password		(Contact AIC)	

All set points refer 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).

Dynamic Setpoint (Weather Compensation) Function

This function serves as a protection to prevent the compressor from working out of the unit temperature envelope. Depending on the outside weather, the heat pump water outlet temperature limit changes (see ***"Limits of Operation" on page G-30***.)

To avoid the unit turning off when the output temperature is higher than limit at given air conditions, this function allows automatic adjustment of the maximum setpoint

The function is ON by default.

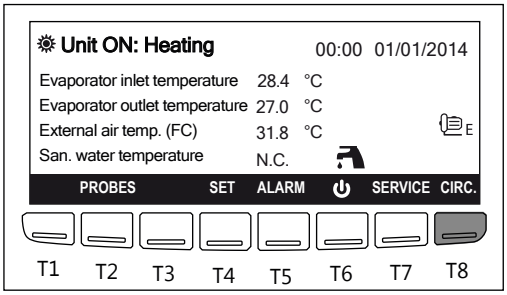
The compressor protection requires setting the dynamic setpoint according to the current temperature set in the main setpoint St04. The parameters should be adjusted to the current St04 setting according to the table below.

St04	Sd02	Sd04	Sd06
61	-8	0,0	-23,0
60	-7	-3,7	-19,3
59	-6	-7,5	-15,5
58	-5	-11,2	-11,8
57	-4	-15,0	-8,0
56	-3	-18,7	-4,3
55	-2	-22,5	-0,5
54	-1	-26,2	3,2
53 or below	0	0,0	0,0

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-19**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-33**.*
- *In some cases, a password is required to access setup or reset functions. Please contact your AIC representative for more information.*

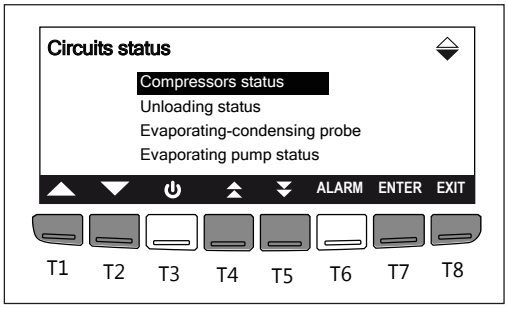
Reading System Data - CIRC Function



Depress:

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

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



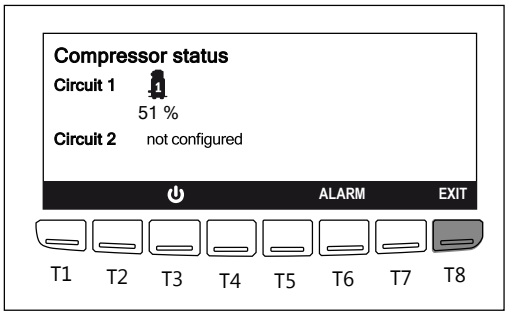
Depress:

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:

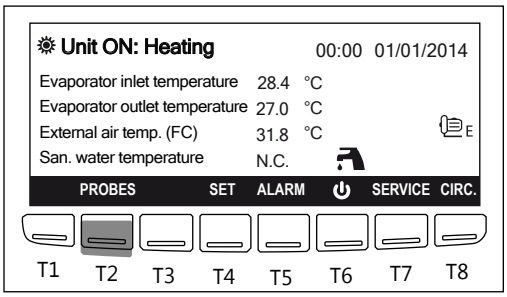
- A black icon indicates an active status
- A white icon indicates an inactive status (standby)

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.

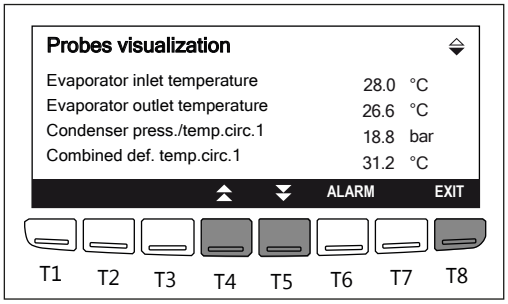
T8 (**EXIT**) to exit the menu go back to the previous screen

Reading System Data - PROBES Function



Depress:

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

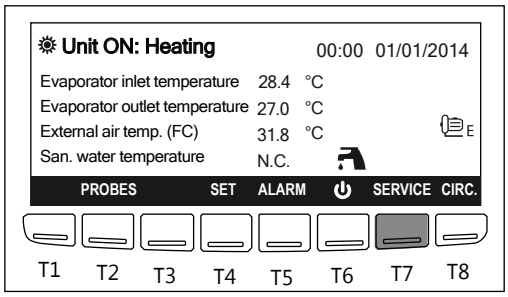


Depress:

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

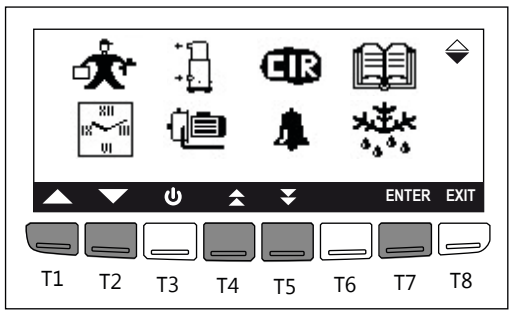
T8 (EXIT) to exit the menu and return to the home screen

Accessing the Service Functions



Depress:

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

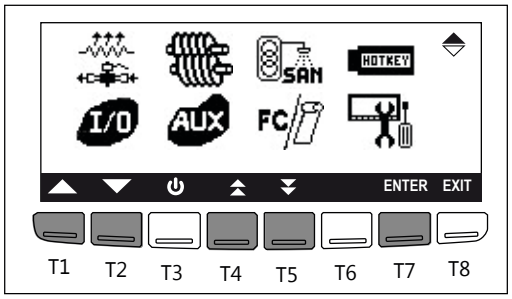


Depress:

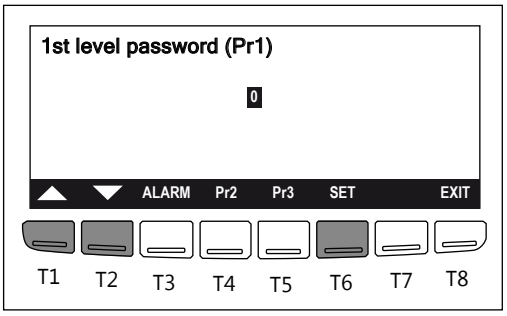
T1 (▲) / **T2** (▼) to scroll through the displayed icons.

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

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



Setting the Service Parameters ( )

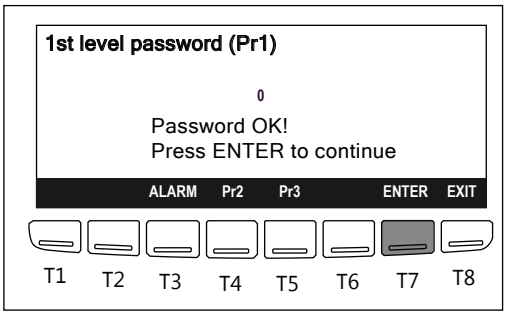


Depress:

T1 (▲) and **T6** (SET) simultaneously to set password to "**1**".

T6 (SET) to confirm

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



Parameter groups

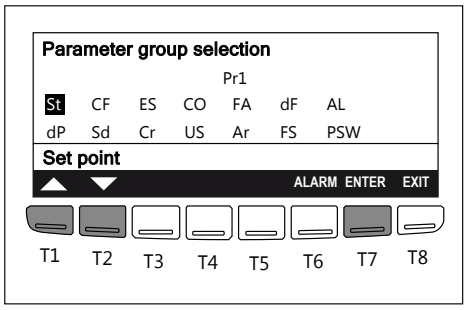
According to user level, different amount of parameters are visible in the parameters programming screen.

- 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).

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

Label	*Meaning*
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

Service Parameters - Set Points



For the related Weather Compensated function curves (Heating mode only), refer to "Dynamic setpoint(Weather Compensation) Function" on page I-61.

Depress:

T1 (▲) / **T2** (▼) to scroll through the functions. and select "**St"**

T7 (ENTER) 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

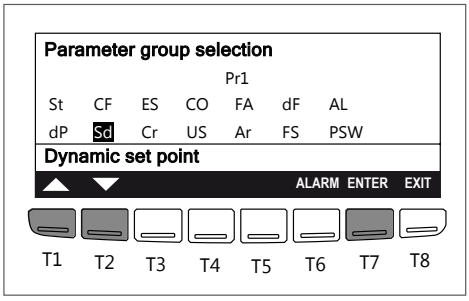
T7 (SET) to enable value change.

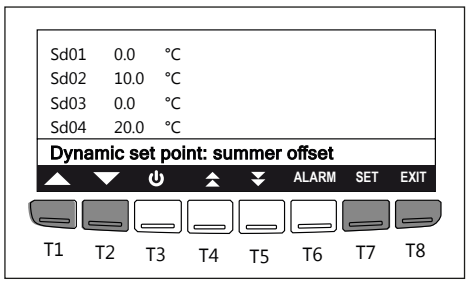
T1 (▲) / **T2** (▼) to perform the value adjustment.

T7 (SET) to validate the change

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

Service Parameters - Dynamic Set Points





For the related Weather Compensated function curves (Heating mode only), refer to "Dynamic setpoint(Weather Compensation) Function" on page I-61.

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 (Sd0.4)**
- **Dynamic set point: summer differential temp (Sd05)**
- **Dynamic set point: winter differential temp (Sd06)**

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

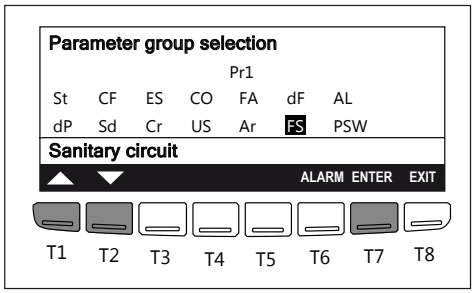
T7 (SET) to enable the value change.

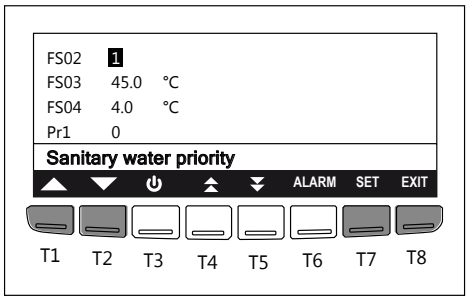
T1 (▲) / **T2** (▼) to perform the value adjustment.

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

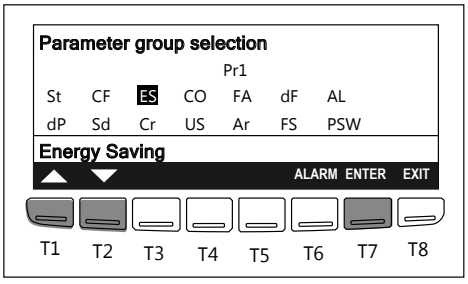
T7 (SET) to enable the value change.

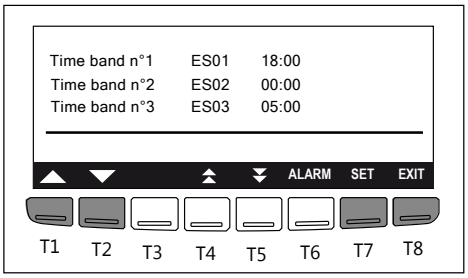
T1 (▲) / **T2** (▼) to perform the value adjustment.

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

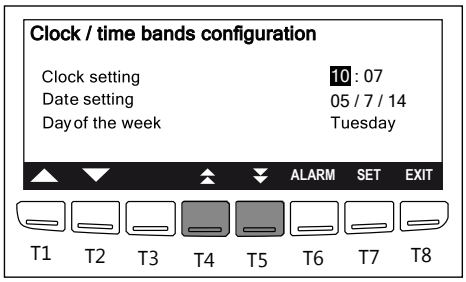
T8 (**EXIT**) to exit the menu and return to the previous screen

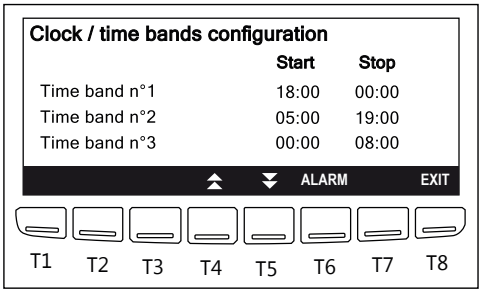
Also refer to "Setting the Time and Date" on page U-35 for Time band parameter reading.

Up to three time bands can be set.

Clock/Time Bands ( )

Also refer to "Setting the Time and Date" on page U-35.





Depress:

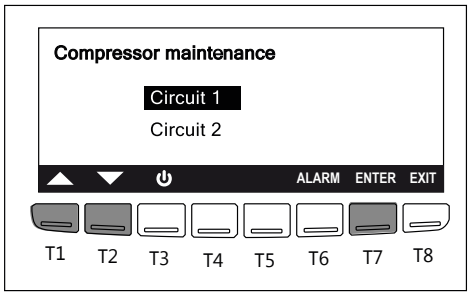
T4 ( ) /**T5** ( ) to read the info about the Energy saving, ON/OFF scheduling and time bands on other screens. Any modification is subjected to an access password. Please contact your AIC representative

T8 (**EXIT**) to exit the menu

Parameter code	*Meaning*
ES01	Start of operating range N°1 (0+2.4)
ES02	End of operating range N°1 (0+2.4)
ES03	Start of operating range N°2 (0+2.4)
ES04	End of operating range N°2 (0+2.4)
ES05	Start of operating range N°3 (0+2.4)
ES06	End of operating range N°3 (0+2.4)
ES07	Monday with energy saving time band Monday operation with automatic on/off
ES08	Tuesday with energy saving time band Tuesday operation with automatic on/off
ES09	Wednesday with energy saving time band Wednesday operation with automatic on/off
ES10	Thursday with energy saving time band Thursday operation with automatic on/off
ES11	Friday with energy saving time band Friday operation with automatic on/off
ES12	Saturday with energy saving time band Saturday operation with automatic on/off
ES13	Sunday with energy saving time band Sunday operation with automatic on/off
ES14	Increased energy saving set in chiller operation
ES15	Differential energy saving set in chiller operation

Parameter code	*Meaning*
ES16	Increased energy saving set in heat pump operation
ES17	Differential energy saving set in heat pump operation
ES18	Maximum unit operating time in OFF by RTC if forced into ON by button
ES19	Time band 1 DHW: start
ES20	Time band 1 DHW: end
ES21	Time band 2 DHW: start
ES22	Time band 2 DHW: end
ES23	Time band 3 DHW: start
ES24	Time band 3 DHW: end
ES25	Monday: time band selection
ES26	Tuesday: time band selection
ES27	Wednesday: time band selection
ES28	Thursday: time band selection
ES29	Friday: time band selection
ES30	Saturday: time band selection
ES31	Sunday: time band selection
ES32	Energy saving: offset DHW setpoint

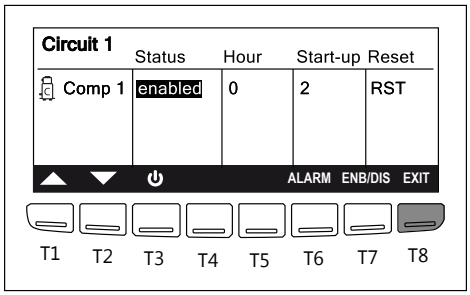
Compressor maintenance ( )



Depress:

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

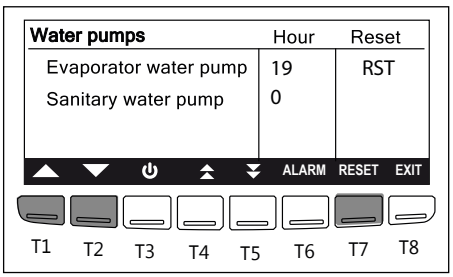
T7 (ENTER) to access the **Circuit status** screen.



The disabling function can only be used by Service personnel

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

Water Pump ( )



Depress:

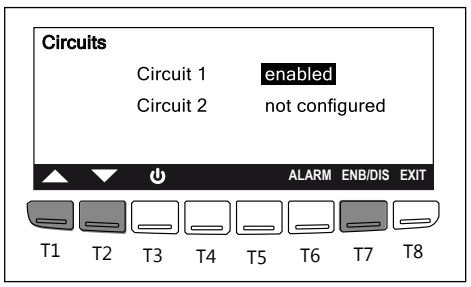
T1 ( ) / **T2** ( ) to scroll through the lines and display the water pumps working hours

T7 (RESET) to reset the counter.

The Reset function can only be used by Service personnel

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

Circuit maintenance ( )



Depress:

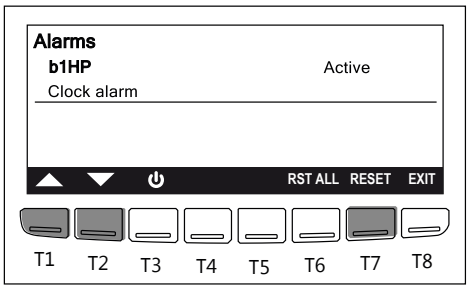
T1 ( ) / **T2** ( ) to scroll through the lines and display the circuits working hours

T7 (ENB/DIS) to reset the counter.

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

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

Alarms ( )



Depress:

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

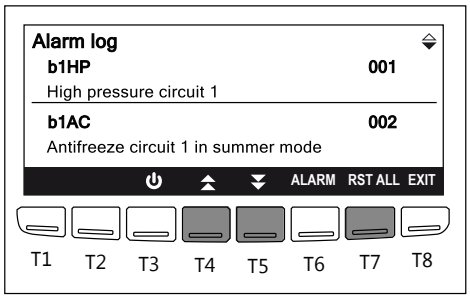
T7 (RESET) to reset the alarm.

The Reset All function can only be used by Service personnel. Also refer to "Resetting an Alarm - ALARM Function" on page U-34.

T8 (EXIT) 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 ( )



Depress:

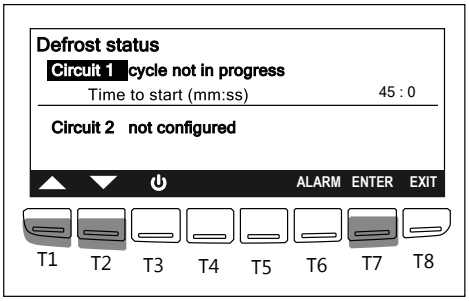
T4 (⏫) /**T5** (⏬) to scroll through the pages of the log (up to 99 errors in the log)

T7 (RST ALL) 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-34.

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

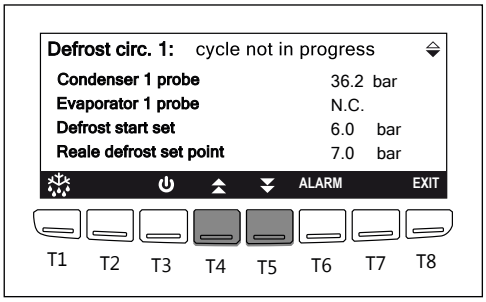
Defrost ( )



Depress:

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

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

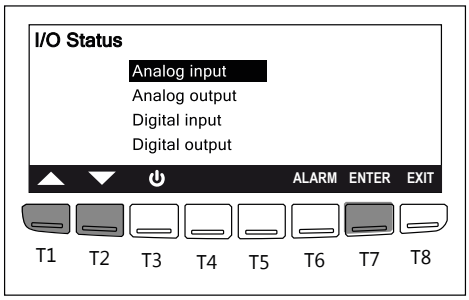


Depress:

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

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

Input/Output Status (I/O)



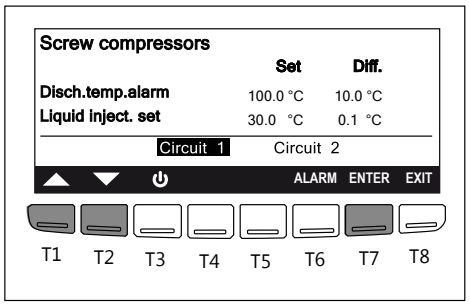
Depress:

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

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

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

Screw Compressor ( ) - if available

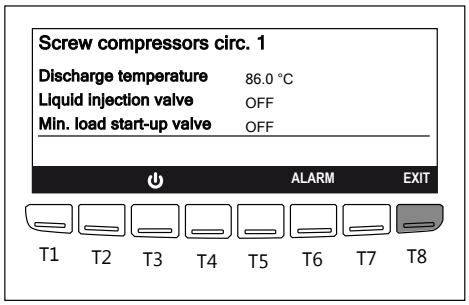


Depress:

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

T7 (ENTER) to access the **Screw Compressor** screen of the selected circuit.

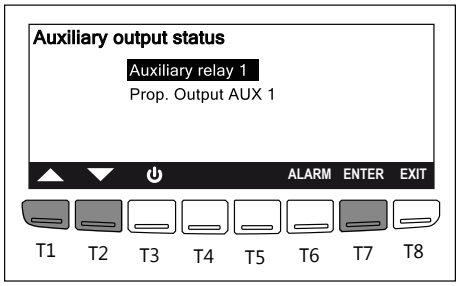
The main screen can display the discharge temperature and the liquid injection set point.



Depress:

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

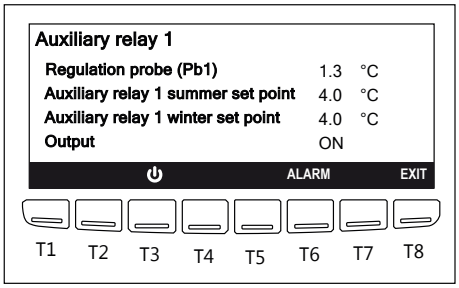
Auxilliary Output (AUX)



Depress:

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

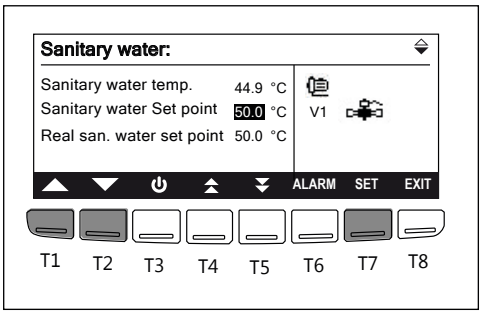
T7 (ENTER) to access the info of the selected line.



Depress:

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

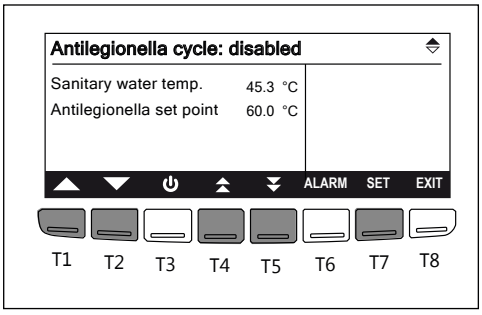
Sanitary Water (SAN)



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.

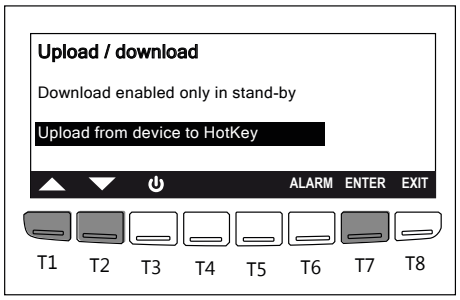
T1 (▲) / **T2** (▼) to perform the value adjustment.

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 (HOTKEY)



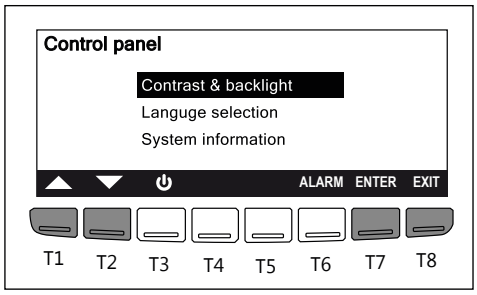
Depress:

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 "Control panel - Screen and Language Set-up" on page U-36.*

Troubleshooting

Machine alarms

Code	Alarm Description	Cause	Solution
ACF1 ... ACF16	Configuration alarm	Configuration of parameters is wrong	▸ Change parameters to correct values. ▸ Contact your 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, ▸ Check waterflow, ▸ Check 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, ▸ Check waterflow, ▸ Check other devices in water circuit. ▸ Check water temp sensor.
ALSF	Phase sequence alarm	Phase order detector tripped	▸ Check Phase order and phase order circuit.
AP1 ... AP8	Probe alarm	Wrong wiring or configuration of probe. Damaged probe	▸ Check probe wiring, ▸ Check probe configuration parameters, ▸ Check for probe damage.
ASLA	Failed communication with I/O expansion	Problem with communication between controller and I/O expansion	▸ Check if lights on I/O module are on, ▸ Check if link cables between modules are connected properly.
AtE1	Overload pump alarm of evaporator	Overload detected on water pump	▸ Check water circuit filters, ▸ Check water pump case temperature, ▸ Check current draw and compare it to value written on nameplate.
AET1	XEV20D 1 Connection alarm	No connection between ipro and XEV20D	▸ Check CAN bus connection between modules, check controller configuration, check if both modules is working, and LED's on them are lit
AtrE	Remote terminal Visograph 2.0 communication alarm	No communication with remote terminal	▸ Check Modbus connection between modules, ▸ Check controller configuration, ▸ Check if both modules are working.

Compressor alarm

Code	Alarm Description	Cause	Solution
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
C(n)tr	Compressor(n) overload		

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)Ac	Anti-freeze alarm signalling of the circuit (n) message in chiller		
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
b(n)Ah	Anti-freeze alarm signalling of the circuit (n) in heat pump		
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)ds	Circuit (n) out of service	Circuit (n) disabled from keyboard	› The gas circuit is restored to normal operation in the menu
b(n)HP	High pressure switch trip	› Water high temperature › External air high temperature › Dirty coil › Fans malfunctioning › Presence of air / incondensable in the coil › Excessive amount of refrigerant › Malfunctioning / pressure transducer out of tune	› Clean air heat exchanger. › Check if the fans are working. › Check refrigerant charge and working pressures. › Replace pressure transducer.
b(n)hP	High pressure on pressure transducer of circuit (n) warning		
b(n)LP	Low pressure switch trip	› Water low temperature › Air external low temperature › Low water flow in the evaporator › Dirty exchanger › Low refrigerant charge / empty circuit › Dirty dryer filter › The expansion valve does not work properly	› Clean air heat exchanger. › Check if the fans are working › Check refrigerant charge and working pressures. › Replace pressure transducer › Replace expansion valve › Replace water filter › Replace filter dryer
b(n)lP	Low pressure on pressure transducer of circuit (n) warning		
b(n)tF	Fan overload in circuit (n)	› Low voltage › Worn or damaged electrical components › Fan motor wear	› Check voltage make sure its within normal values. › Replace fan.

Unit timing*

Time	Description
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
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 bar	Condenser pressure start up fans
32,0 bar	Condenser pressure max speed fans
35%	Minimum speed fans
80%	Maximum speed fans

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

Indication	Cause	Solution
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 recovey. Recharge the system with a new refrigrant.
	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.

aicON

Connect to aicON on your computer or install the app on your smartphone or tablet to:

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

https://tracker.aicon.myaic.eu/dashboard/login

Download on the App Store

GET IT ON Google Play

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

www.myaic.eu