

# INVERTER HEAT PUMP

for pool water heating

## AZURO INVERCORE CP series

WITH WIFI MODULE

Operating and maintenance instructions



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# 1. INTRODUCTION

We would like to thank you for choosing our heat pump.

The heat pump is manufactured to strict standards to ensure quality and reliability for our customers. This operating manual contains all the information necessary for the installation, commissioning and maintenance of the system. Read the operating instructions carefully before working with or servicing the system. The manufacturer of this system assumes no responsibility for personal injury or property damage resulting from improper installation, commissioning or inadequate maintenance.

This document is an essential part of the product and must be kept in the engine room or near the heat pump.

## 1.1 Using the heat pump

The heat pump is intended exclusively for heating the pool water and maintaining its temperature at the desired value economically. Any other use is considered improper.

The heat pump achieves its highest efficiency at air temperatures of  $15 \div 26$  °C. At temperatures below  $+8$  °C the system has low efficiency and at temperatures above  $+40$  °C the system can overheat. Do not use the system outside the temperature range of  $-7 \div 40$  °C.

To function properly, the heat pump must have a water flow rate that is specified in chapter 3.1 **Technical data**.

## 1.2 How the heat pump works

The heat pump allows heat to be extracted from the air around the swimming pool through a cycle of compression and expansion of the heat transfer fluid. The air is driven by a fan through an evaporator, in which it transfers its heat to the heat transfer fluid (the air is cooled in the process). The heat transfer fluid is then transported by a compressor, which compresses and heats it, to the heat exchanger coils, where it transfers its heat to the pool water. The cooled liquid flows from the heat exchanger into the expansion valve, where it is depressurized and cooled quickly. This cooled liquid flows back into the evaporator, where it is heated by the flowing air. The entire process is continuous and monitored by pressure and temperature sensors.

By selecting the heat pump mode, the circulation direction can be reversed and the pool water can be cooled.

## 1.3 Checking the packaging

The system is delivered fully assembled, ready for connection to the swimming pool filtration pipes and for connection to the single-phase socket.

When installing, all you need to do is insert the condensate drain plug into the corresponding hole in the bottom of the housing.

Before any other manipulation of the device, check that it is complete.

**Note:** The illustrations and descriptions in these instructions are not binding and may differ from the product actually delivered. The manufacturer and the supplier reserve the right to make any changes without being obliged to update this manual.



### **Symbol for waste separation in the countries of the European Union**

**Protect the environment! Do not dispose of electrical devices with household waste!**

In accordance with EU Directive 2012/19/EU, old electrical devices must be collected separately and recycled in an environmentally friendly manner. You can obtain information about the disposal of your old device from your local or city administration.

## 2. SAFETY INSTRUCTIONS



**CAUTION: Before first use, read this instruction manual.**



**CAUTION: Before installing, read this instruction manual.**



**CAUTION: Read these operating instructions before servicing or repairing.**



**CAUTION: DANGER. Contains flammable gas.**



**CAUTION: The device contains live electrical components. The device may only be opened by a person with appropriate electrical engineering qualifications. Risk of electric shock.**

- (a) This machine is not intended to be used by persons (including children) with reduced physical, sensory or mental capabilities unless they are supervised by a responsible person or have received instructions on how to use the machine; by people who are not familiar with the operation of these instructions; or by persons under the influence of drugs, narcotics, etc. that impair their ability to react.
- (b) The location of the heat pump must comply with the IEC 60364-7-702 standard, i.e. at least 3.5 m from the edge of the pool.
- (c) The heat pump supply circuit must comply with the relevant standard (IEC 60364) and be protected with a residual current circuit breaker with a tripping current of 30 mA.
- (d) Interventions in the electrical installation of the heat pump and the supply circuit may only be carried out by persons with the appropriate electrical engineering qualifications.
- (e) Do not install the heat pump in areas where it may be flooded with water.
- (f) Make sure that there are no children playing in the heat pump's working area. The main switch of the heat pump must be out of the reach of children.
- (g) Do not operate the heat pump if it is not complete, including the protective cover. The rotating fan can cause serious injury. The internal piping is hot during operation; touching it can cause burns.
- (h) If you find that the heat pump supply cable or supply cable extension cable is damaged, immediately turn off the pump circuit breaker and repair the fault.
- (i) Maintenance and operation must be carried out in accordance with this manual at the recommended times and frequency.
- (j) Maintenance and operation must be performed in accordance with this instruction manual at the recommended times and frequency.
- (k) Use only original spare parts. Failure to follow these recommendations will void the warranty for this system.
- (l) The operating instructions must always be available at the location where the heat pump is used. Save these instructions for future reference.
- (m) This heat pump is intended exclusively for heating/cooling swimming pools. Any other use is considered unsafe and unsuitable.

- (n) Assembly, connection to the power grid and commissioning must be carried out by a qualified person.
- (o) When connecting the pump to a socket (power supply), ensure that the phase, working and ground cables are laid correctly.
- (p) It is essential that the temperature of the swimming pool is kept below the value recommended by the swimming pool manufacturer.

### 3. DESCRIPTION OF THE SYSTEM AND TECHNICAL SPECIFICATIONS

#### 3.1 Technical data

Model	AZURO	12 kW	17 kW	21 kW
Type		CP120ES	CP170ES	CP210ES
Heating Capacity A26/W26*	kW	12.0 ~ 2.9	17.5 ~ 4.4	21.0 ~ 5.4
COP A26/W26*		7.0 ~ 14.8	7.2 ~ 16.1	7.2 ~ 16.0
Heating Capacity A15/W26*	kW	8.5 ~ 2.3	12.0 ~ 3.4	14.9 ~ 4.2
COP A15/W26*		5.3 ~ 8.2	5.2 ~ 8.1	5.1 ~ 8.0
Power Input*	kW	2.0 ~ 0.2	2.8 ~ 0.29	3.7 ~ 0.38
Current*	A	9.0 ~ 1.0	12.6 ~ 1.4	17.0 ~ 1.7
Power supply	V/Hz	230/50		
Compressor		1, inverter, rotary compressor		
Heat exchanger		Titanium in PVC		
Water connection (via screw)	mm	50		
Protection class		IP X4		
Noise level 1 m	dB(A)	40 ~ 50	42 ~ 52	43 ~ 53
Required Water Flow	m <sup>3</sup> /h	5.5	8	9
Refrigerant (R32)	g	600	1100	1050
CO <sub>2</sub> greenhouse gas equivalent	t	0.41	0.74	0.71
GWP	-	675	675	675
Dimensions	cm	93 x 35 x 61.5	103 x 36 x 71.5	107 x 43 x 79.5
Packaging dimensions	cm	99 x 40.5 x 65	108 x 46 x 75	113 x 53 x 83
Net / gross weight	kg	51 / 59	66 / 76	78 / 88
WiFi module	-	Yes	Yes	Yes

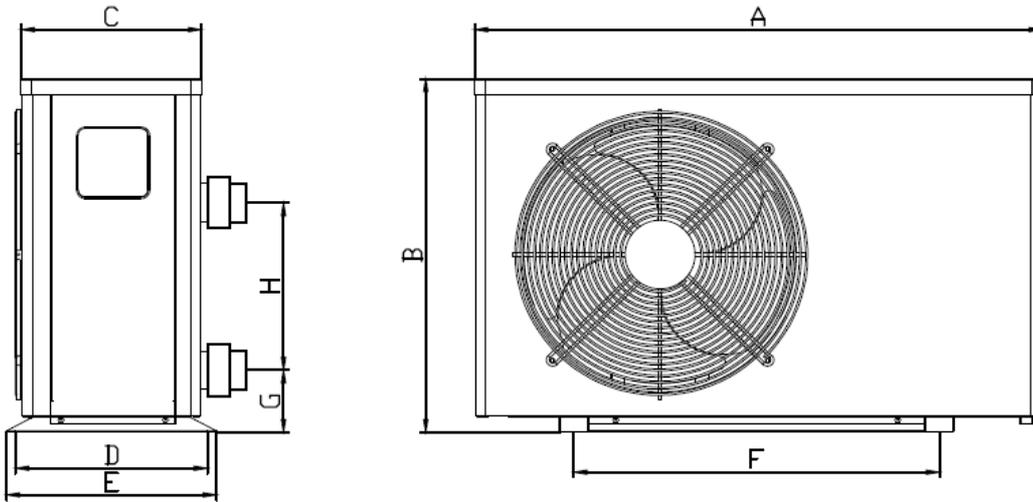
\* These values may vary depending on the climate and operating conditions and the operating mode set.

#### 3.2 Pool water parameters

The heat pump is designed to heat pool water that meets the requirements of healthy bathing water. Limit values for the operation of the heat pump: The pH value must be in the range of 6.8 - 7.9, the total chlorine content must not exceed 3 mg/l.

The water hardness must be kept at the lower end of the optimal range, i.e. just above 8 °N.

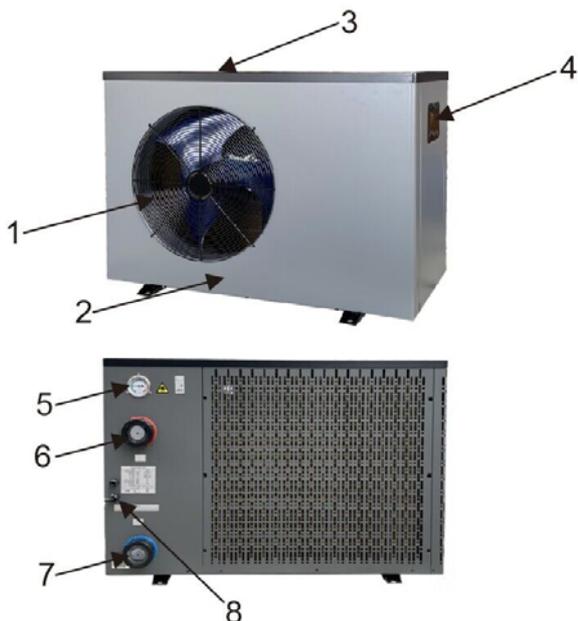
### 3.3 Dimensions of the heat pump



Model	A	B	C	D	E	F	G	H
CP120ES	915	600	300	312	340	585	106	270
CP170ES	1030	727	320	334	360	702	105	390
CP210ES	1120	802	386	445	470	825	105	400

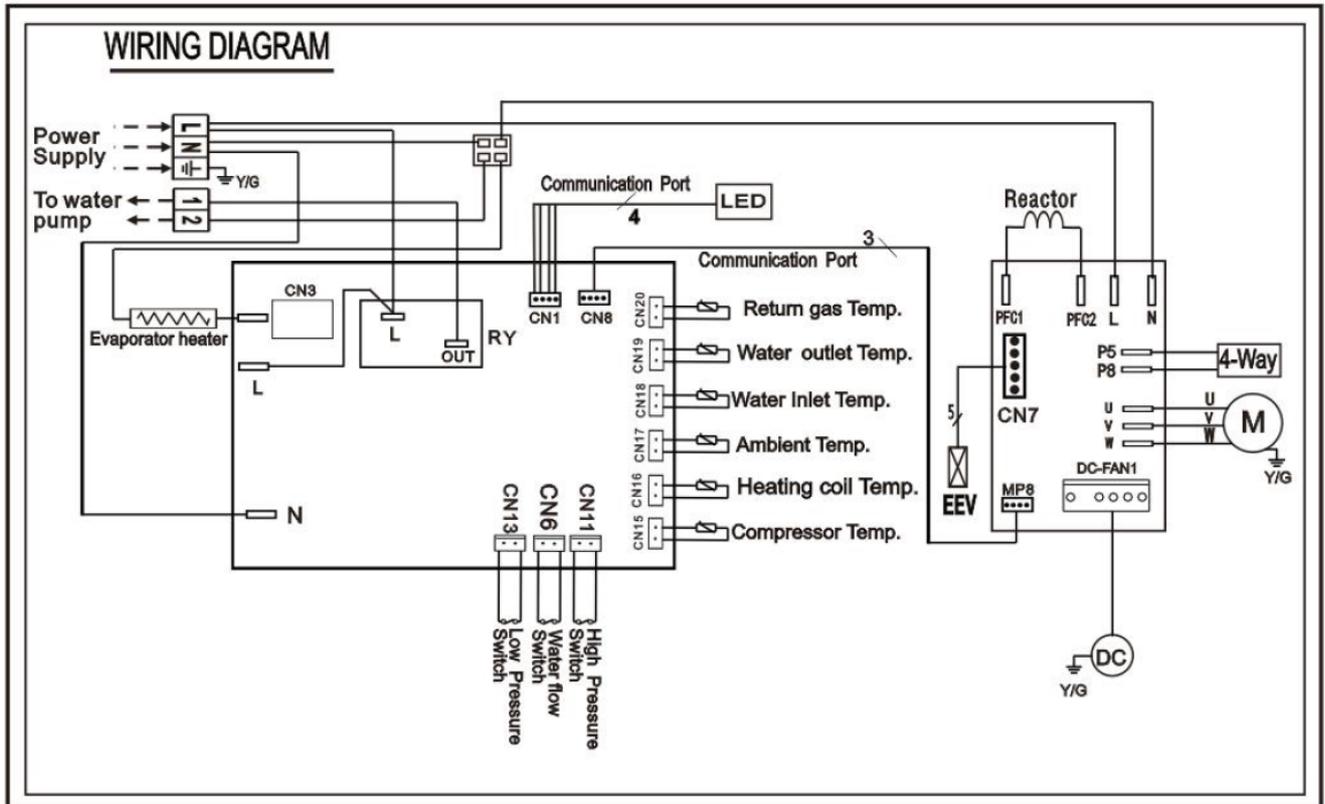
**Note:** The dimensions are given in millimetres.

### 3.4 Description of the main parts



- 1 – Fan protection grille (air outlet)
- 2 – Front Cover
- 3 – Top Cover
- 4 – Control panel
- 5 – Refrigerant pressure gauge
- 6 – Connection piece for the water outlet
- 7 – Connection piece for the water inlet
- 8 – Grommet for power cord

### 3.5 Circuit board connection diagram

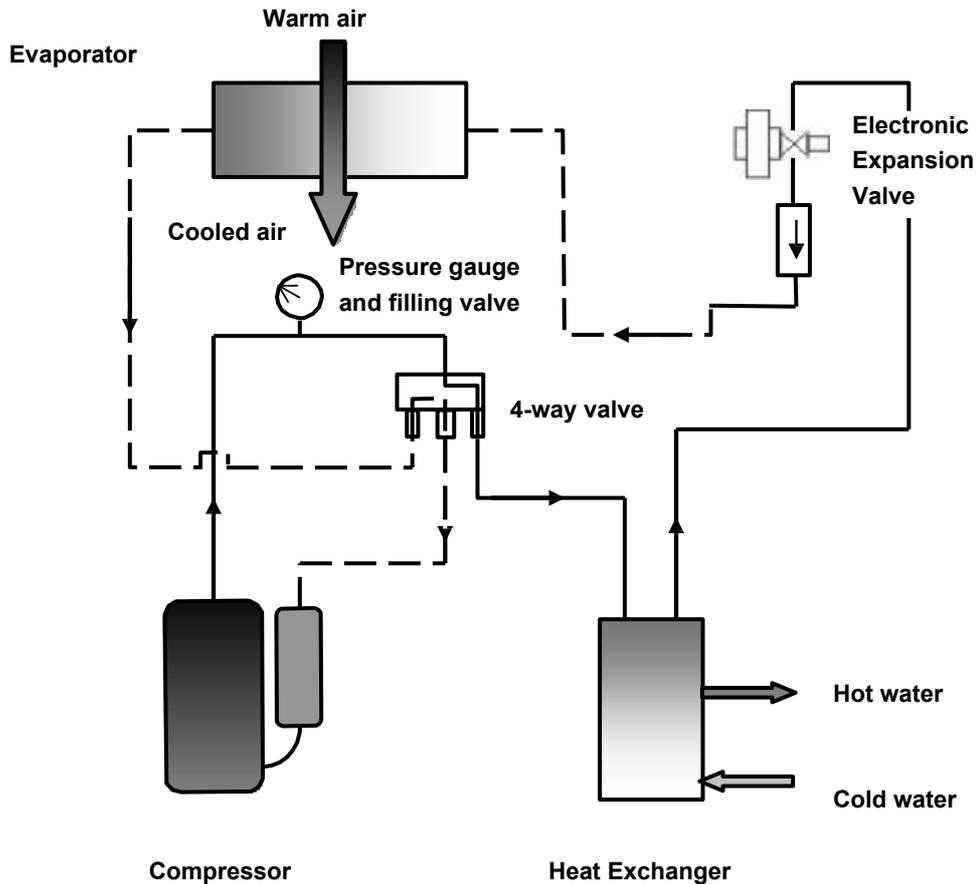


### 3.6 General plan of the cooling circuit

The heat pump is reversible so the pool can be heated or cooled:

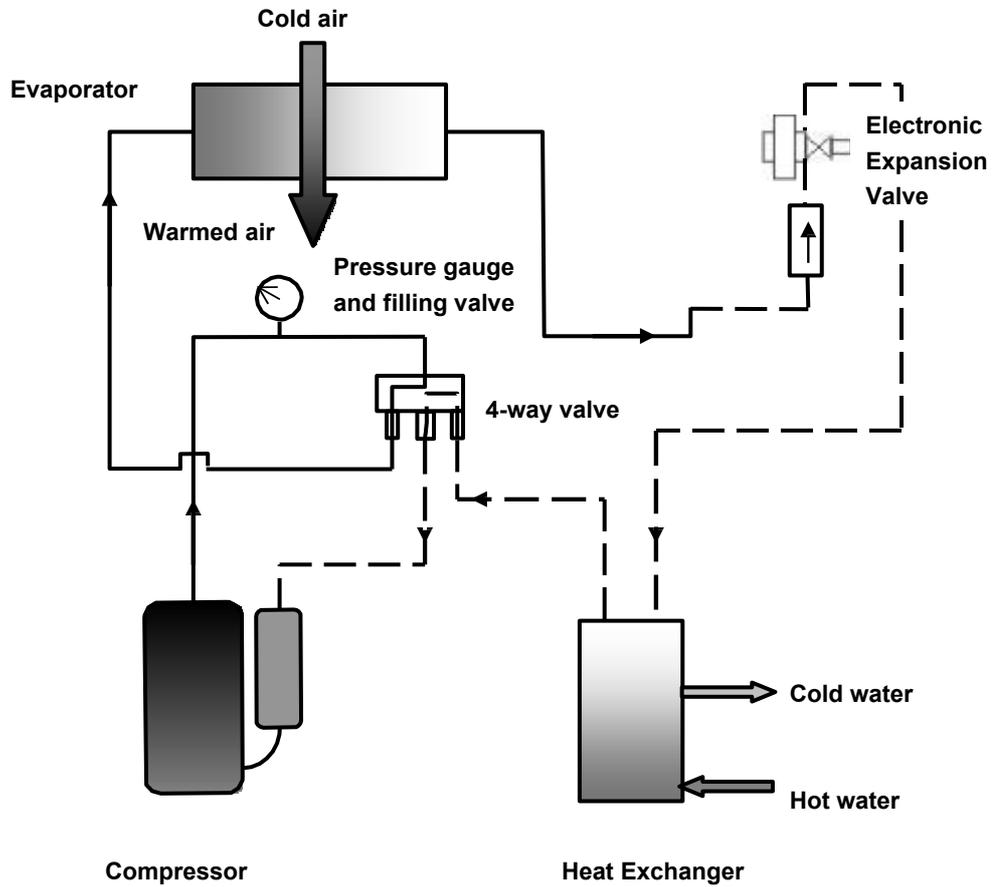
#### Pool water heating operation:

The cool and liquid refrigerant absorbs the heat contained in the air via the evaporator (hot cooler) in which it evaporates; in the gaseous state, the liquid is further compressed by the compressor and sent to the heat exchanger, where it gives off heat to the pool water and returns to the liquid state; It loses pressure in the expansion valve and cools down even further before returning to the evaporator for a new cycle.



**Pool water cooling operation:**

A 4-way valve reverses the direction of coolant flow. The liquid evaporates in the heat exchanger (condenser) while heat is removed from the water; in the gaseous state, the liquid passes through the compressor, which heats it by compression and sends it to the evaporator, where it gives off heat to the surrounding air and returns to the liquid state; In the expansion valve it loses pressure, cools down even more and enters the heat exchanger (condenser) again, where it is heated by the pool water.



## 3.7 Safety and control systems

The heat pumps are equipped with the following protection systems as standard:

### 3.7.1 Water flow switch

With this flow switch, the heat pump only works when the filter pump is running (and water is circulating). This system prevents the heat pump from only heating the water in the heat pump itself. The protection also switches off the heat pump if water circulation is interrupted or reduced.

### 3.7.2 Protection against high and low refrigerant pressure

The high-pressure protection protects the heat pump from damage in the event of excess gas pressure. The low-pressure protection gives a signal when refrigerant leaks from the refrigerant circuit.

### 3.7.3 Protection against compressor overheating

This protection protects the compressor from overheating.

### 3.7.4 Automatic defrosting

If the air is very humid and cold, ice can form on the evaporator. In this case, a thin layer of ice forms that builds up as long as the heat pump is in operation. If the evaporator temperature is too low, automatic defrost is activated, which reverses the operation of the heat pump for a short time and allows the hot refrigerant gas to flow into the evaporator for defrosting.

### 3.7.5 Frost protection in winter

This protection is only functional when the heat pump is in standby mode and the filter pump is controlled by this heat pump.

This protection requires year-round power supply. If you want to reduce operating costs, we recommend winterizing the pump (see Chapter 7.2 **Winterization**).

#### **First stage of frost protection**

When the ambient temperature falls below 4 °C and at the same time the water temperature falls below 4 °C, the heat pump automatically switches on the filter pump for 10 minutes and 30 seconds to prevent the water in the pipes from freezing. This protection is deactivated as soon as the ambient temperature and the water temperature rise above 5 °C.

#### **Second stage of frost protection**

If the ambient temperature falls below 4 °C and the water temperature falls below 2 °C at the same time, the heat pump starts heating the water. This protection is deactivated as soon as the ambient temperature rises above 5 °C and the water temperature rises above 3 °C.

\*If the water inlet temperature sensor does not work when the ambient temperature falls below 4 °C, the second stage of frost protection will also be triggered. It will stop when the ambient temperature rises above 5 °C.

If the ambient temperature sensor does not work when the water inlet temperature is between 2 °C and 4 °C, the first level of frost protection is also triggered. If the water inlet temperature falls below 2 °C, the second frost protection level is also triggered. And it ends when the water inlet temperature rises above 5 °C.

If neither the ambient temperature nor the water inlet temperature sensor works, the frost protection no longer works either.

While the frost protection is in operation, the message P17 appears on the display.

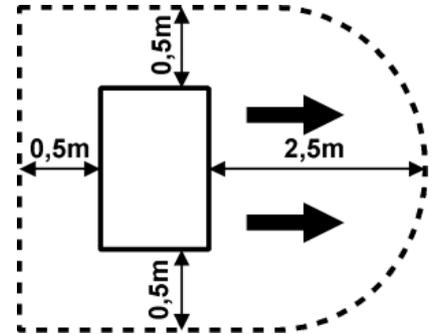
## 4. Installation and connection of the heat pump

### 4.1 Selection of location

The heat pump is intended for outdoor installation and will work in virtually any outdoor environment as long as the following three conditions are met:

#### 1. Fresh air - 2. Electricity connection - 3. Piping with pool filtering

- (a) Do not install the pump in an enclosed area with restricted air access where air cannot circulate adequately. The air inlet and outlet of the heat pump must be completely free. There must be no objects in the heat pump's working area, as shown in the illustration below. Do not place the heat pump between bushes and thicket, as these can also restrict air access. Any obstruction to the free flow of air will reduce the efficiency of heat exchange and may even cause the pump to fail completely.



- (b) The system must be installed in a location protected from direct sunlight and other heat sources, preferably so that it can draw air from a sunlit area. It is recommended to erect a loose canopy over the heat pump to protect the system from direct rain, direct sunlight and snow.
- (c) Do not install the system near car traffic. Increased dust generation leads to a gradual deterioration in heat exchange performance.
- (d) The air outlet should not be directed at places where the cold air flow could be disruptive (window, terrace, ...). Do not direct the air outlet against the prevailing wind direction.
- (e) The distance of the system from the edge of the pool must not be less than 3.5 m. It is recommended to install the heat pump within 7 m of the pool, with the total length of the connecting pipe not exceeding 30 m. It should be noted that the longer the connecting pipeline, the greater the heat loss of the distribution system. Although heat loss is lower if most of the piping is underground, to give an idea, 30 meters of piping (if the ground is not wet) has a heat loss of about 0.6 kW/hour (2000 BTU) per 5 °C difference between the water temperature of the swimming pool and the ground temperature in the area around the pipe, which can be translated into an extension of the heat pump's running time by approx. 3 - 5%.
- (f) The system must be installed on a flat and solid surface such as a concrete base or a steel frame. The heat pump housing must be attached to the surface (base or frame) with screws or bolts through rubber vibration dampers. Rubber vibration dampers (silent blocks) not only reduce the noise level of the heat pump, but also extend its service life.
- (g) This base must be high enough to prevent water from seeping into the bottom of the machine. The height must be adjusted so that the condensate drain valve can be connected.
- (h) The back wall of the evaporator consists of soft metal fins. This surface can be easily damaged. Therefore, choose a location and take precautions to avoid damage to the slats.
- (i) If the device is intended for use in winter, place it in a place protected from snow.

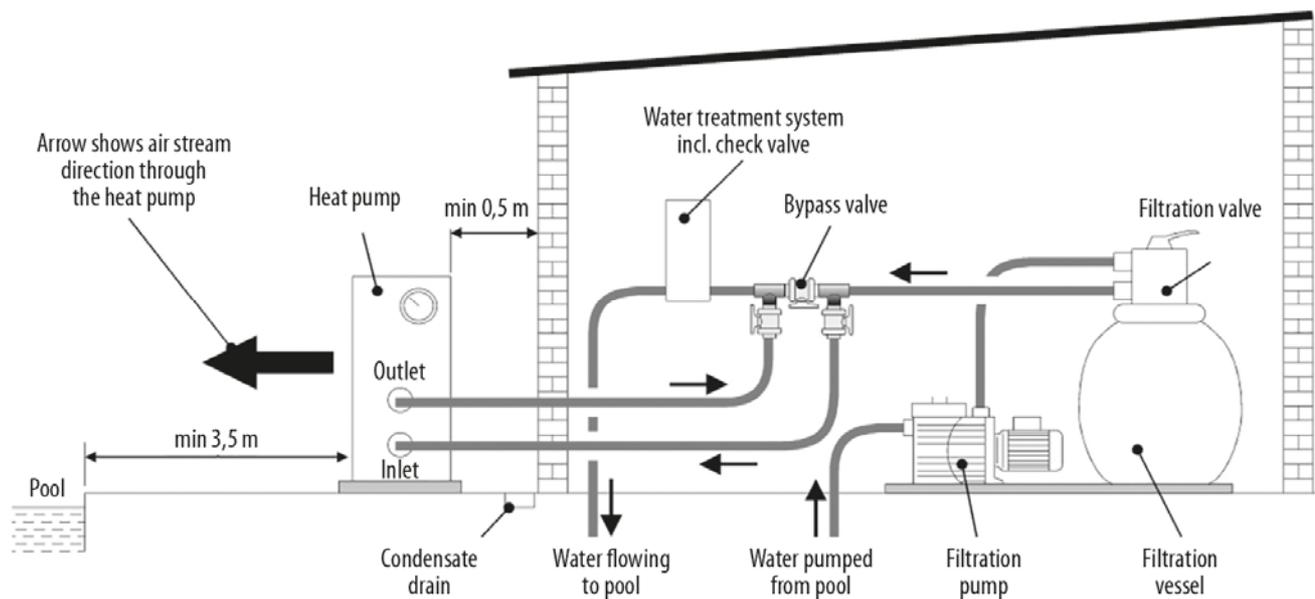
**Note:** Please contact your supplier regarding location and connection to indoor swimming pools.

## 4.2 Installing the heat pump

- (a) The heat pump must be used in conjunction with a filter system that is part of the user's swimming pool installation. The flow rate through the heat pump should correspond to the recommended value (see table in chapter 3.1 **Technical data**) and can be up to 2 times higher. For correct use of the heat pump, a **bypass** consisting of three taps must be installed to regulate the flow of the heat pump (see chapter 6.2 **Adjusting the water flow and pressure in the cooling circuit**).
- (b) The heat pump is equipped with an inlet and outlet fitting for connecting a d50 pipe with a union nut and a rubber sealing ring. Therefore, to connect to the filter circuit, use a PVC d50 pipe, or you can use transition fittings 50/38 mm (not included) and connect everything with  $\varnothing$  38 mm hoses. The lower fitting is intended for the entry into the heat exchanger, the upper one for the exit. Lubricate the threads with grease before screwing in the union nut. Insert the d50 pipe into the exchanger sleeve with an overlap of at least 1 cm and a maximum of 2 cm. Also consider using quick couplings for the pump inlet and outlet so that the heat pump can be easily separated from the rest of the filter circuit, both for draining the pump during winter storage and for maintenance work.
- (c) The heat pump must be connected to the swimming pool filter circuit behind the filter and before the water treatment system (automatic chlorine doser, ozonizer, etc.). A typical filter circuit connection is shown in the following figure.

**Note:** A titanium spring check valve must be installed upstream of the automatic chlorine doser (if used in a filtration circuit). If this valve is missing, the chlorine concentration in the area of the heat pump's heat exchanger rises above the permissible value and damages the heat pump when the filtration is switched off.

### Typical connection of a filtration circuit to a heat pump



**Note:** Only the heat pump is supplied by the manufacturer. The other components in the illustration are filter circuit components provided by the user or installer.

## 4.3 Electrical connection

### 4.3.1 Socket connection



**IMPORTANT:** The heat pump comes with a power cord without a plug. The installation of the plug and socket must comply with the requirements of the IEC 60364 standard, including appropriate protection and the use of a residual current circuit breaker with a tripping current of up to 30 mA.

Switching the heat pump on and off is described in Chapters 5 and 6.

### 4.3.2 Fixed electrical connection

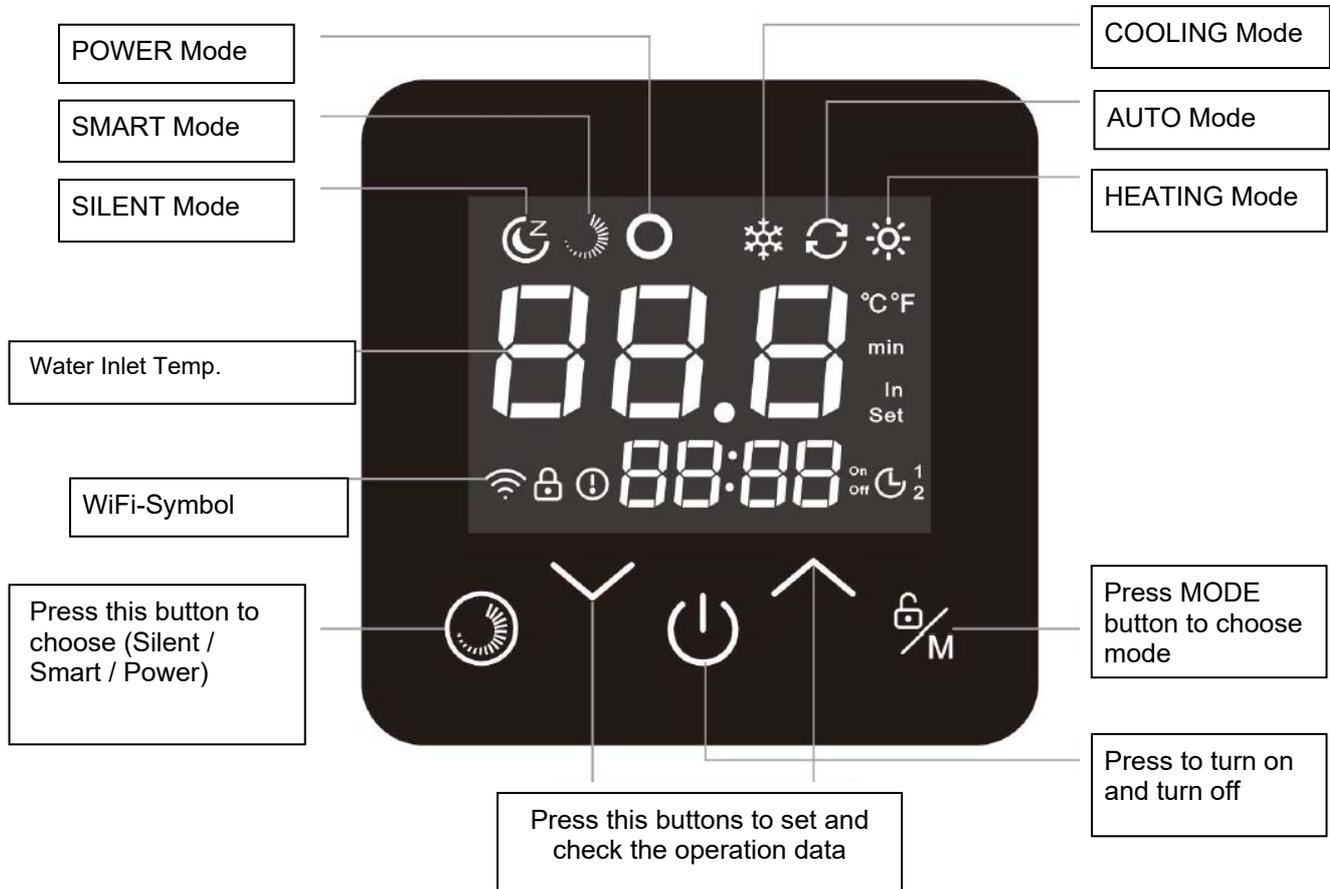


**IMPORTANT:** If you decide to make a permanent electrical connection to the heat pump, this is an intervention in the electrical installation that may only be carried out by a person with appropriate electrical engineering qualifications and must comply with the requirements listed below:

- (a) The heat pump and the power supply to the filter system pump must, if possible, be connected via a separate circuit breaker and a switch or timer for periodic switching on. The supply line must be adequately designed (3x 2.5 mm<sup>2</sup> conductor cross-section is recommended) and be equipped with a residual current circuit breaker with a triggering current of up to 30 mA. The characteristics of the electrical network (voltage and frequency) must be compatible with the operating parameters of the device.
- (b) The length of the supply cable between the residual current circuit breaker and the heat pump must not exceed 12 m.
- (c) Electrical wiring must be carried out by a qualified technician in accordance with applicable electrical codes and standards.
- (d) The heat pump's electrical installation must be properly grounded. The impedance of the grounding line must comply with applicable electrical codes and standards.
- (e) The power and control cables must be wired and laid as simply and clearly as possible, without unnecessary crossings.
- (f) The wiring must be carefully checked for errors and measured before commissioning.
- (g) A block diagram of the electrical wiring can be found in Chapter 3.5.

## 5. Control unit

### 5.1 Function of the control unit with LCD display



### 5.2 Explanation of symbols

Symbol	Meaning	Symbol	Meaning
	SMART heating mode		Water inlet temperature
	SILENT heating mode		Target temperature
	POWER heating mode		Timer ON or OFF
	SMART cooling mode		Clock or timer
	SILENT cooling mode		Error
	POWER cooling mode		Key lock
	SMART AUTO mode		WiFi

## 5.3 Application of the control unit

### 5.3.1 Changing the operating mode:

Pressing the button  changes the operating mode: Heating – Cooling – Auto.

### 5.3.2 Changing performance mode:

By pressing the button  the performance mode is changed.

### 5.3.3 Setting the target temperature:

When the device is turned on, press the up button  or down button  to open the temperature setting interface. You can use the up button  or down button  to set the target temperature. If no button is pressed for approximately 3 seconds, the display will return to showing the water inlet temperature.

### 5.3.4 Control and setting of user parameters (both ON and OFF):

Press the button  for 3s to enter the user parameter control interface in the standard interface. To change a parameter, press the Up button  or Down button .

Press the button  to set the user parameters in the user parameter control interface. “SET” starts flashing. To change the value, press the Up button  or Down button . Press the button again  to return to the user parameter control interface (“SET” does not flash).

If you do not press any button for about 30 seconds while checking user parameters or their settings, the changes are automatically saved and the display switches to the standard display. Press the button  to immediately return to the standard display.

Number	Meaning	Area	Factory setting
L0	Filter pump mode	0/1 0 (always) 1 (L1 + 5 min)	1
L1	Time interval for the filter pump to operate after the compressor stops	3 ~ 120 mins	30 min
L2	ON/OFF timer	0=NO / 1=YES	1
L3	Memory after power off	0=NO / 1=YES	1
L4	---		
L5	Basic performance mode	0 = heating 1 = cooling 2 = heating and cooling 3 = inverter	3

**Note:** The factory settings may differ from the information in the table.

### 5.3.5 Time setting:

- Press the down button  for 5 seconds to open the time setting interface. The hours and minutes flash.
- Press the button  to set the hour. The hour flashes. Pressing the up button  or down button  changes the value.
- Press the button  again to set the minutes. The minute flashes. Pressing the up button  or down button  changes the value.
- Press the button  again to return to the standard interface.
- In the time setting interface, if you do not press any button for about 30 seconds, the changes will be automatically saved and the display will change to the default display. Press the button  to immediately return to the standard display.

### 5.3.6 Timer settings:

Parameter L2: Timer ON/OFF

0: Timer OFF, timer symbol does not light up

1: Timer ON, timer symbol lights up

- Press the button  3 seconds to open the timer setting interface. Timer 1 flashes first. There are a total of two timers available.
- Press the button  to set the clock to turn on while Timer 1 is flashing. Pressing the Up  or Down button  changes the value while the hours flash.
- Press the button  again to set the minutes. Pressing the Up  or Down button  changes the value while the minutes flash.
- Press the button  again to set Timer 1 to Off. The procedure is the same as above.
- Press the button  again to save the timer setting. To set timer 2, you can press the up button  or down button . The procedure is the same as for Timer 1.
- When the timer is on, the number on the display lights up.
- If the start time and end time are the same, the timer will not work.
- In the time setting interface, if you do not press any button for about 30 seconds, the changes will be automatically saved and the display will switch to the default display. Press the button  to immediately return to the standard display.
- In the timer setting interface, press the button  for 3 seconds to activate the selected timer.
- In the timer setting interface, you can also press the button  for 3 seconds to deactivate the selected timer.

### 5.3.7 Control panel lock:

- If you do not press any button for 60 s, the control panel will be locked and the key lock icon will light up.
- To unlock, press the button  for 5 seconds.

### 5.3.8 Restore factory settings (only when power is off):

- Press the buttons  and  for 5 seconds to restore factory settings.
- Press the buttons  and  for 3 seconds to clear the error log.

### 5.3.9 Condition of the system:

- Press the button  for 3 seconds to enter the current state checking interface. To check a parameter, press the Up  or Down button .

Code	Meaning	Code	Meaning
T1	Refrigerant temperature at the compressor outlet	r1	N/A
T2	Refrigerant temperature at the evaporator inlet	r2	Electric heating YES/NO
T3	water inlet temperature	r3	N/A
T4	Leaving water temperature	STF	4-way valve YES/NO
T5	Outside temperature of the spiral	HF	N/A
T6	Ambient temperature	PF	N/A
T7	IPM temperature	PTF	N/A
T8	Internal temperature of the spiral	Pu	Water pump ON/OFF
T9	N/A	AH	High speed AC motor ON/OFF
T10	N/A	Ad	AC motor medium speed ON/OFF
T11	N/A	AL	Lower AC motor ON/OFF speed
Ft	Compressor target frequency	dcU	DC bus voltage
Fr	Compressor working frequency	dcC	Inverter compressor current
1F	Main expansion valve orifice	AcU	Input voltage
2F	Auxiliary expansion valve orifice	AcC	Input current
od	1: Cooling... 4: Heating	HE1	Error code log
Pr	AC Motor: 1:H, 2:M, 3:L DC motor: speed (number *10)	HE2	Error code log
dF	Defrost	HE3	Error code log
OIL	N/A	HE4	Error code log
Pr	Protocol version	Sr	Software version

### 5.3.10 Using the Boost CORE app

To control the heat pump you can use your smartphone and the **Boost CORE app**, which you can download for free from the Apple Store (for iOS) or the Google Store (for Android).



**Note:** The WiFi module may not be included with the product. Information on this can be found in the product specification.

**Note:** Instructions for using the app can be downloaded from the product website at [www.mountfield.com](http://www.mountfield.com).



## 6. Application and operation of the system

### 6.1 Operating instructions

#### IMPORTANT:

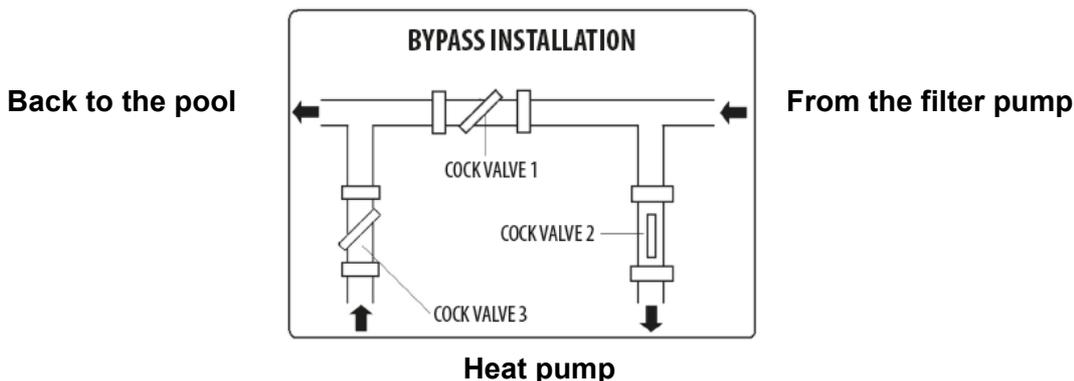
- ❑ In order for the heat pump to heat the swimming pool, the filter pump must be in operation and the water must flow through the heat exchanger.
- ❑ Never switch on the heat pump if there is no water and the filter system is not in operation.
- ❑ Never cover the heat pump; the ambient air must flow through the heat pump when it is in operation.
- ❑ Protect the heat pump from freezing. Drain the water from the filter system and heat pump before frost sets in and winterize them according to the instructions.

### 6.2 Setting the water flow and pressure in the cooling circuit

If the filter circuit is equipped with a bypass (not included with the heat pump), this can be used to adjust the heat pump for optimal operation after commissioning.

#### Using the bypass

The bypass consists of a trio of taps connected as shown below. On the right is the inlet from the filter pump, on the left is the return line back to the pool.



Close cock valve 1 completely and open cock valves 2 and 3 at the heat pump inlet and outlet. Under these conditions, the maximum amount of water flows through the heat pump. Start the heat pump in heating mode. Wait until the pressure gauge display stabilizes. The correct pressure setting should be between 21 and 35 kg/cm<sup>2</sup> (bar).

If the pressure settles below 21 kg/cm<sup>2</sup> you will need to open cock valve 1 and close cock valve 3 to reduce the water flow through the heat pump.

If the pressure stabilizes above 35 kg/cm<sup>2</sup>, the flow through the filter circuit is insufficient. Take measures to increase flow.

#### Routine adjustment of the three bypass cock valves

**COCK VALVE 1:** Turned on so that the heat pump pressure gauge shows a pressure between 21 and 35 kg/cm<sup>2</sup> (bar).

**COCK VALVE 2:** Open.

**COCK VALVE 3:** Half closed.



This completes the adjustment of the bypass valve, in principle there is no reason to adjust it during the season. See also chapter **6.5 Possible problems due to external conditions**.

### 6.3 Water condensation

The lower evaporator temperature during heat pump operation causes air moisture to condense on the evaporator fins and form condensation or frost. If the relative humidity is very high, this can lead to several liters of condensation per hour. The water runs down the fins into the bottom of the housing and drains through a plastic connector designed to connect to a 3/4" PVC hose that allows the condensate to be drained into a suitable drain

It is very easy to swap the condensed water with leakage water from inside the heat pump. There are two easy ways to determine whether it is condensate or not:

1. Turn off the device and only run the pool pump. If the water no longer drains, it is condensation
2. Test whether the draining water contains chlorine (if the pool is treated with chlorine) - if there is no chlorine in the draining water, it is condensate.

**Note:** Any moisture around the device is due to the precipitation of water vapor and is completely acceptable

### 6.4 Automatic evaporator defrosting

If the air is very humid and cold, ice can form on the evaporator. In this case, a thin layer of ice forms as long as the heat pump is in operation. If the control diagnostic system determines that the evaporator temperature is too low, the flow direction of the heat transfer fluid is reversed for a short time, so that hot gas flows over the evaporator and the ice defrosts within a short time.

### 6.5 Possible problems due to external conditions

Under certain external conditions, the heat exchange between the refrigerant and the water on the one hand and between the refrigerant and the air on the other hand may be insufficient. This can lead to an increase in pressure in the refrigeration circuit and to increased power consumption by the compressor.

A temperature sensor at the compressor outlet and a circuit breaker in the unit's power line protect it from these extreme conditions. The error message P11 will then appear on the display.

**The causes of this condition are as follows:**

#### Heating mode

- Insufficient water flow. To increase the heat exchange between refrigerant and →water, close the bypass valve.

#### Cooling mode

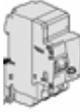
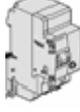
- Too much water flow. To reduce the water flow and thus →increase the heat exchange between water and refrigerant. Open the bypass valve.
- Insufficient air flow. Make sure the evaporator fins are not clogged.

**Note:** This error message is most likely to appear when the pool water and ambient air temperatures are high.

## **6.6 Information on operating the heat pump**

- ❑ **The efficiency of the heat pump increases as the room air temperature increases.**
- ❑ **It may take several days to reach the desired temperature. This time is completely normal and depends mainly on the climatic conditions, the volume of water in the pool, the size of the water surface, the operating time of the heat pump and the heat loss from the pool (e.g. through evaporation from the water surface, heat transfer, radiation, etc.). If adequate measures are not taken to limit heat losses, maintaining a high water temperature will not be economical and in some cases not even possible.**
- ❑ **Use a cover or shade sail to limit heat loss when the pool is not in use.**
- ❑ **The pool water temperature should not exceed 30 °C. Warm water is not very refreshing and also creates optimal conditions for algae growth. Additionally, some pool components may have temperature restrictions. For example, the foil can soften in foil pools. Therefore, do not set the thermostat higher than 30 °C.**

## 6.7 Simplified operating scheme

Task	External system or heat pump control button	Display	Heat pump response
Switching on the power supply to the heat pump	Insert the plug of the supply cable into the socket; If there is a permanent connection, switch on the circuit breaker for the heat pump's supply circuit. 		The water inlet temperature is displayed.
Put in pool water circulation into the pipes	Turn on the water filter pump.		
Starting the heat pump	Press the button 		The heat pump is started in the previous operating mode (heating/auto/cooling) within a period of 1 to 4 minutes
Switching between operating modes	Press the button 		The heat pump stops for 3-4 minutes, changes the operating mode and starts in the new operating mode
Pool water temperature adjustment	 Selectable in the range from 15 °C to 41 °C		The heat pump heats or cools the water until the desired temperature is reached
Performance mode selection	Press the button 		The heat pump works in full, smart or silent mode
stop	Press the button 		The heat pump stops immediately and remains in standby mode.
Turn off	Unplug the power cable from the socket; If there is a permanent connection, turn off the circuit breaker of the heat pump's supply circuit. 		Complete shutdown of the heat pump

**Note:** If the panel lock is activated, it must first be unlocked.

## 7. MAINTENANCE AND INSPECTION

### 7.1 Maintenance



**CAUTION:** The device contains live electrical components. The device may only be opened by a person with appropriate electrical engineering qualifications. Risk of electric shock.



**IMPORTANT:** Before carrying out any work on the device, make sure that it is disconnected from the power supply.

- (a) Clean the swimming pool and the filter system regularly to avoid damage to the system due to a dirty or clogged filter.
- (b) Check the power supply and the condition of the power cord regularly. If the device no longer functions properly, switch it off immediately and contact an authorized service workshop.
- (c) Regularly check the pump's working area (see illustration in Chapter **4.1 Selecting the location**), keep it clean and remove any accumulated dirt, leaves or snow.
- (d) When not in use, unplug the heat pump, drain the water and cover it with a waterproof tarpaulin or PE film.
- (e) To clean the outside of the heat pump, use normal dishwashing detergent and clean water.
- (f) Regularly clean the external surface of the evaporator from stuck-on dirt using a soft brush. Check the surface of the evaporator to make sure the fins are not wrinkled. The slats can be carefully straightened using a flat, non-sharp tool. The guarantee does not cover mechanical damage to the slats.
- (g) Periodically check the tightness of the screws securing the device to the base, the screws securing the covers, and the wear of the power cord. Clean rusted parts with a wire brush and treat them with an anti-corrosion paint.
- (h) Periodically remove the top cover and clean the inside of the heat pump from dirt.
- (i) All repairs must be carried out by a qualified technician.
- (j) Cooling system maintenance must be performed by a qualified technician.

### 7.2 Winterization

- (a) Disconnect the heat pump from the mains.
- (b) Close bypass taps 2 and 3 (see illustration in chapter 6.2 Adjusting the water flow and pressure in the cooling circuit).
- (c) Drain the water from the pump by unscrewing the pipes from both ports of the filter circuit (**RISK OF FREEZING**).
- (d) Suck the remaining water in the pump exchanger dry (**RISK OF FREEZING**).
- (e) Screw the line back in (but do not tighten) to prevent dirt or water from getting into the pump.



**IMPORTANT:** Proper winterization is very important. No water may remain in the pump's heat exchanger. Freeze damage to the heat exchanger is not covered by the warranty.

### 7.3 Warranty conditions, service and spare parts

The warranty period is listed in the sales document, is at least 24 months and begins when the product is taken over; This must be proven with the original sales receipt. The guarantee covers defects that the product has when it is taken over as well as verifiable manufacturing defects that occur during the guarantee period. The warranty does not cover normal wear and tear of the product and its parts, as well as damage caused by failure to follow the operating instructions, neglect of maintenance, improper use, intentional damage, improper intervention, modification or repair using non-original parts, external influences (oxidation, corrosion, flooding, etc.). Repairs during the warranty period may only be carried out by authorized workshops or the manufacturer's service workshop.

The service and spare parts are provided by Mountfield as through its sales outlets and service centers.

### 7.4 Error messages

Explanation of error messages caused by control component errors or safety operations. If multiple errors occur at the same time, each error code will be displayed one after the other for 5 seconds, as will the water inlet temperature.

Code	Problem	Cause	Solution
E01	Sensor error at compressor output	Connection error	Check connection
		Sensor error at compressor output	Replace sensor on compressor output
E05	Sensor error on the evaporator	Connection error	Check connection
		Temperature sensor error on the evaporator	Replace evaporator temperature sensor
E09	Sensor error on the return pipe	Connection error	Check connection
		Temperature sensor error	Replace temperature sensor
E17	Water inlet temperature sensor error	Connection error	Check connection
		Water inlet temperature sensor error	Replace water inlet temperature sensor
E18	Leaving water temperature sensor error	Connection error	Check connection
		Leaving water temperature sensor error	Replace leaving water temperature sensor
E21	Communication error between main board and module board	Converter error	Replace converter plate
E22	Ambient temperature sensor error	Connection error	Check connection
		Ambient temperature sensor error	Replace ambient temperature sensor
E25	Flow switch error	Insufficient water flow	Check water flow
		Flow switch error	Replace flow switch
E27	Communication error between control panel and converter	Communication cable error	Check or replace cable
		Control panel error	Replace control panel

Code	Problem	Cause	Solution
P02	High pressure error	Insufficient water flow	Check water pump
		Pressure switch out of order	Have the pressure switch replaced
		Cooling gas high pressure	Have the pump checked by a service technician
P06	Low pressure error	Insufficient refrigerant	Have the pump checked by a service technician
		Refrigerant leak in distribution system	Have the pump checked by a service technician
P11	Temperature at the compressor outlet too high	Water temperature or ambient temperature too high	Set safe water temperature
		Refrigerant leak	Check and repair
		Insufficient water flow	Check water flow
P15	Water overheating	Insufficient water flow	Flow switch error
			Check water pump
			Clogged pipe
P16	Low leaving water temperature protection in cooling mode	Connection error	Check connection
		Temperature sensor error	Replace temperature sensor
		Water flow too low	Check water circuit
P17	Protection against freezing *	Normal device protection	No action required
P19	Compressor current protection	Normal device protection	No action required
P24	Fan motor error	Fan motor damaged	Replace fan motor
		Motherboard error	Replace motherboard
P25	Protection at low ambient temperatures	The ambient temperature is too low or the protection temperature is set too high	Check and repair
r02	Compressor error	Connection error	Check and reset
		Motherboard error	Replace motherboard
r05	IPM module overheating protection	IPM module is overheating	Set mode to SMART
			Check and replace module
r06	Overcurrent protection	Current too high	Check electricity supplier
			Water temperature is too high
r10	DC surge protection	DC short-circuit voltage too high	Check and replace module
r11	DC short circuit protection	DC short-circuit voltage too low	Check and replace module
r12	AC voltage protection	Voltage supply too high or too low	Check power supply
r21	IPM module overcurrent protection	Current to IPM is too high	Set mode to SMART
r24	Abnormal power supply	Abnormal power supply	Check power supply

**IMPORTANT:** Contact an authorized service workshop if any changes need to be made to the electrical installation of the device.

