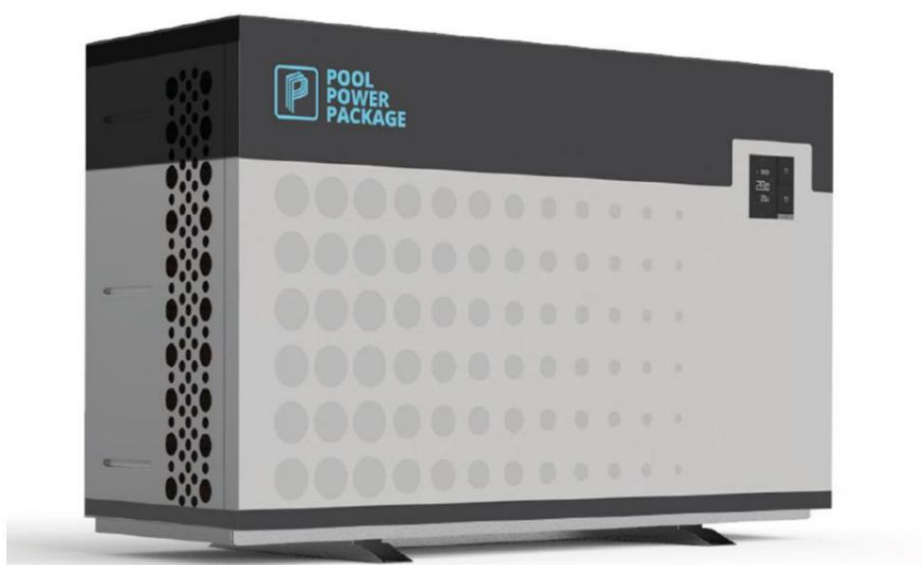


# ***VBEX***

## **Swimming pool heat pump**



## **Installation & Instruction Manual**



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## 1) Foreword

Congratulations on the purchase of your **VBEX swimming pool heat pump**.

This swimming pool heat pump is produced under very strict production requirements to meet the applicable quality standards.

This manual contains all necessary information for use, installation and what to do in the event of malfunctions and maintenance.

Read this manual carefully before connecting and using the swimming pool heat pump.

The manufacturer and supplier of this product cannot be held responsible for any injuries or damage to this pool heat pump due to incorrect installation, incorrect use, incorrect or no maintenance.

It is therefore important that this manual is read carefully.

The swimming pool heat pump must be installed by a recognized and qualified installer.

In the event of a malfunction or defect, you must contact your supplier/installer, who will, depending on the report, take the correct steps and possibly have a qualified technician check the installation

The pool heat pump must be checked and maintained periodically.  
When replacing parts, only original parts may be used.

Failure to follow this recommendation will void the product's warranty.

Our heat pump has the following features:

### 1 Durable

The heat exchanger is made of PVC and titanium tubes that can withstand prolonged exposure to pool water.

### 2 Installation flexibility

The device must be installed outdoors.

### 3 Quiet operation

The unit consists of an efficient rotary/scroll compressor and a low-noise fan motor, which ensures silent operation.

### 4 Advanced control

The pool heat pump includes microprocessor control, which allows to set all operating parameters.

The status can be shown on the LCD display.

**1.1) WARNING** Do not use means

to accelerate the defrosting process or to clean, other than those recommended by your supplier.

The appliance must be placed and/or stored in a room/environment without continuously operating sources of ignition. For example: no open flames, no operating gas appliance, no operating electric heating, no burning candles, etc.

Do not pierce or burn.

Please note that refrigerant has no odor and is flammable, The unit should be installed, operated and stored in a room with a floor space of more than 30ÿ.

This product contains the flammable refrigerant **Refrigerant R32** Depending on the European and legislation in your country, a refrigeration check must be carried out regularly.

For this you can contact your supplier/installer.



Regularly check whether the power cable is not damaged and still meets all applicable requirements as set.

In the event of damage, replace immediately by a recognized technical installer.

The device must be installed in accordance with the regulations in force.

Transport of equipment containing flammable refrigerants.

Compliance with applicable transport regulations.

Marking of equipment using signs.

Removal and recycling of the pool heat pump by certified personnel only.

1. The device can only be repaired by qualified personnel or an authorized dealer.
2. This appliance is not intended for use by persons (including children) with reduced mobility physical strain 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.
3. Supervise children to ensure that they do not play with the appliance.
4. Make sure that the device and the power connection are properly grounded, otherwise it may cause a cause electric shock.
5. If the power supply is damaged, it should be replaced by a qualified person immediately and certified person to avoid danger.
6. Directive 2002/96/EC (WEEE):

The crossed-out wheelee bin symbol under the appliance indicates that, at the end of its useful life, this product must be treated separately from household waste, taken to a recycling center for electrical and electronic appliances or returned, in consultation, to your supplier.
7. Directive 2002/95/EC (RoHs): This product complies with Directive 2002/95/EC (RoHs) regarding restrictions on the use of harmful substances in electrical and electronic equipment.
8. The device **CANNOT AND SHOULD NOT be placed** near flammable gases, liquids or materials are installed.

The refrigerant gas R32 used in this appliance is flammable.
9. The device must be connected to a sufficiently sized fuse/circuit breaker. Improper and faulty assembly may result in electric shock or fire. The device must also be grounded.
10. The heat pump in the unit is equipped with an overload protection system.

It does not allow the device to start for at least 3 minutes after a previous interruption.
11. The appliance can only be repaired by qualified personnel from an installer or an authorized dealer.
12. The installation may only be carried out by an authorized person in accordance with the NEC / CEC.
13. Note: Single-walled heat exchanger, not suitable for drinking water connection.

## 1) Specifications

### 2.1) Specification by Model

## VBEX FULL INVERTER HEAT PUMP

Technische specificaties VBEX full inverter Zwembad Warmtepompen					
MODEL		VBEX 10/1F H8	VBEX 13/1F H8	VBEX 18/1F H8	VBEX 20/1F H8
Zwembadvolume max (1) (4) (5)	M <sup>3</sup>	35	45	60	75
Verwarmingcapaciteit (2)	kW	1,9-9,5	2,4-13	2,5-17,8	3,5-20
Opgenomen vermogen (2)	kW	0,2-1,39	0,15-1,96	0,15-2,80	0,2-3,3
Bedrijfsstroom verwarmen A x stroom (2)	A	6,5	9	13	16
COP (2)		16,1-6,8	16,5-6,6	16,5-6,4	16,3-6,5
Verwarmingcapaciteit (3)	kW	1,4-7	1,6-9,1	2,3-12,8	2,5-14,7
Opgenomen vermogen (3)	kW	0,2-1,5	0,2-1,9	0,4-2,7	0,36-3,2
COP (3)	5-8	6,8-4,7	6,7-4,8	6,5-4,8	7-4,6
Maximale frequentie	Hz	80	90	85	90
Voeding	V/Ph/Hz	220 - 240 / 1 / 50	220 - 240 / 1 / 50	220-240 / 1 / 50	4,1 - 7,2
Geluidsdruk 1m	dB (A)	36 - 47	39 - 47	40 - 50	41-51
Geluidsdruk 10m	dB (A)	27	28,5	30	31
Geluidsdruk 1m silence mode	dB (A)	36	39	40	41
Geluidsdruk 10m silence mode	dB (A)	32	34	37	37
Werkingsgebied min-max	dB (A)	- 7 / 43	- 7 / 43	- 7 / 43	- 7 / 43
Water hoeveelheid	°C	3,2	4,1	5,2	5,6
Afmetingen LxBxH/KG		1030x455x635 / 60	1030x455x635 / 61	1130x500x800 / 75	1210x530x900 / 89

1) Bad voorzien van lamellenafdekking, zwemseizoen eind april / eind september

2) Water 26 graden / lucht 27 graden / RV 80%

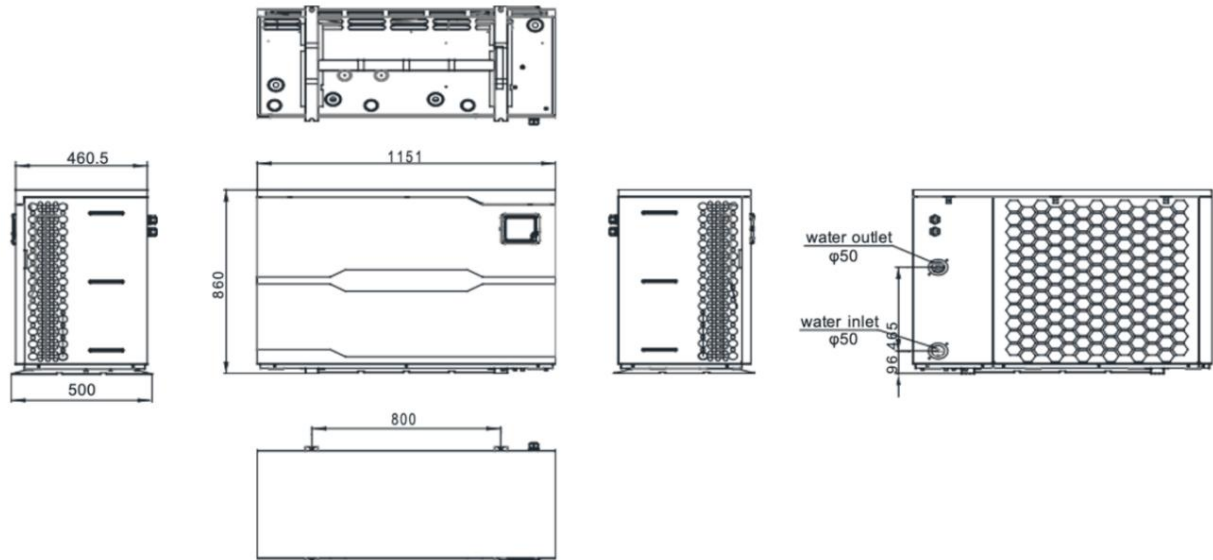
3) Water 26 graden / lucht 15 graden / RV 70%

4) Zwembadpomp dient in voor- en najaar 24 uur per dag actief te zijn

5) Luchttemperatuur min. 15°C

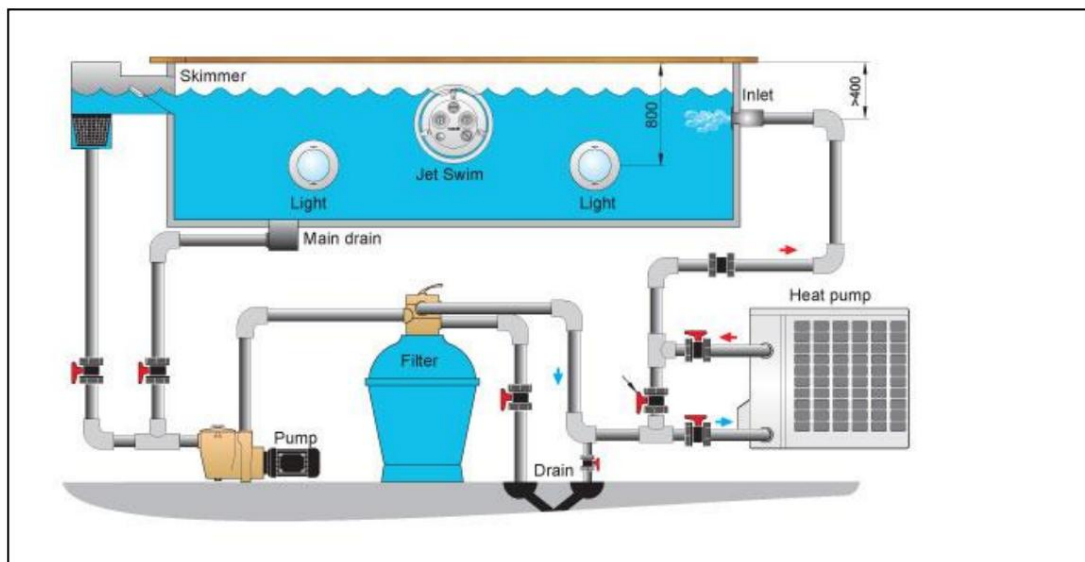
## 2.2) Dimensions

**Model: VBEX 10/1F H8 / 13/1F H8 / 18/1F H8 / 20/1F H8**



## 3) Installation and connections

### 3.1) Installation of the system



### **Installation requirements**

The delivery only includes the swimming pool heat pump, the other components and accessories can be supplied by your installer. The drawing above shows schematically how a system can be constructed.

For starting up the pool heat pump after it is fully connected:

1. Make sure the bath is filled with enough water.
2. Open the supply and return control valves.
3. Use the by-pass control valve to regulate the correct amount of water.
4. Read and use this manual for setting up the control

**NB!** Make sure the water inlet is higher than the surface of the water.

The schematic diagram is for reference only. Manually check the water inlet and outlet on the heat pump for correct installation.

### 3.2) Swimming pool heat pump location

The swimming pool heat pump can be installed outdoors at almost any location.

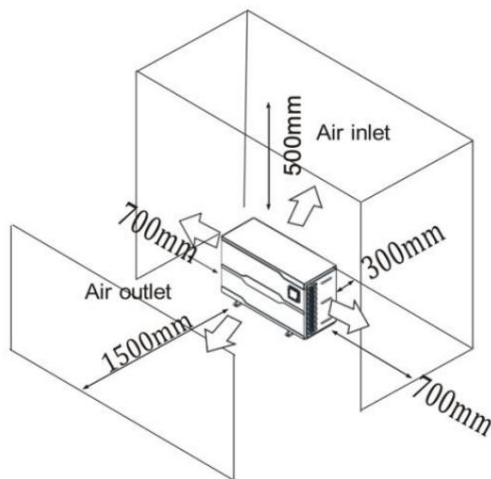
For indoor pools, please contact your supplier.

DO NOT place the heat pump in an enclosed location with limited air volume.

As a result, there is a chance that an air short circuit will occur and the swimming pool heat pump will not function correctly.

DO NOT place the heat pump against vegetation, which may affect the air inlet or air outlet.

This may not benefit performance and efficiency and may mean reduced heat output.



### 3.3) Heat loss pipes

Normally, the swimming pool heat pump is placed within 7.5 meters of the swimming pool. The greater this distance, the greater the heat loss from the pipes.

Most of the pipes are underground. As a result, the loss of up to 15 meters is minimal, unless the soil is moist or the groundwater level is high.



A rough estimate of the heat loss is about 0.6 kW/h per 5 degrees temperature difference between pool water and the temperature of the ground in which the pipe runs, which corresponds to an increase in running time of 3 to 5%.

### 3.4) Swimming pool heat pump pipes

The swimming pool heat pump with titanium heat exchanger does not require any special piping, with the exception of a by-pass.

The water pressure drop is less than 10 kPa at maximum flow.

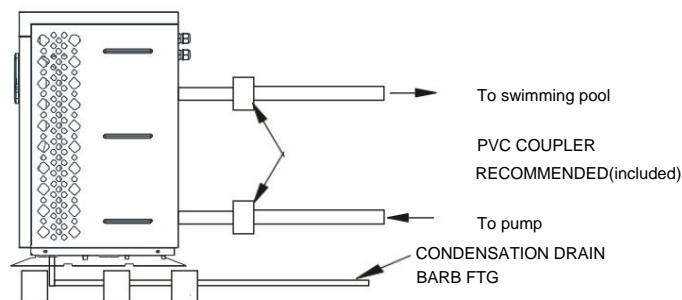
Because no external heating is used, the pipe can be connected directly to the pump.

Connect all filters and pumps in the return line before the heat pump, and all chlorine installations, ionizers or other chemical pumps in the supply line after the heat pump.

The standard model has a glue connection for the supply and return lines.

These are suitable for connection 50 mm. Use the coupling that is included. This allows the supply and return to be disconnected more quickly for water-side emptying for the winter season.

This is also easier for maintenance or possibly. service.



Condensation: Because the heat pump cools the air by about 4 to 5 degrees, water can condense on the fins of the evaporator. If the humidity is high, this can add up to several liters of water per day. This water will be drained through the bottom plate with condensation holes. This condensation water is allowed to flow off naturally. You do not need to provide any provision for this.

If the pump is placed in a critical place, use a drip tray where the water is collected and can become central

discharged. Note: It often happens that the user mistakes condensation for leakage. You can then indicate the above to him.

If you are in doubt whether it concerns condensation water or a leak in the exchanger or connections, you can do the following; Switch off the swimming pool heat pump – if the water stops flowing after a few minutes, then it is condensation water. If the water continues to flow, please contact your installer/supplier.

Condensed water does not contain chlorine or other products such as

used in the pool.

### **3.5) Electrical wiring for swimming pool heat pump**

Although the heat exchanger is electrically isolated from the rest of the product, this only prevents a short circuit between the electrical circuit and the bath and condensation water.

The pool heat pump **MUST** always be earthed!

The unit has a separate electrical terminal block with separate connections for power supply to the unit. Remove the screw from the cover for the power connection panel. Feed the electrical wiring through the cover, using the rubber seal provided in the cover. Connect the power supply to the terminal block in the correct order. Respect the order as connected in the pump. Work must be carried out by a certified electrical installer. The swimming pool heat pump must be externally equipped with correct fuses, all in accordance with the applicable laws and regulations.

If required, the swimming pool heat pump must be fitted with an operating switch. The earth leakage circuit breaker or circuit breakers must be within sight or in an easily accessible place.

It prevents the device from being left unattended and allows the device to be turned off during device maintenance

### **3.6) Initial start-**

up Starting procedure: After installation, these following steps must be followed:

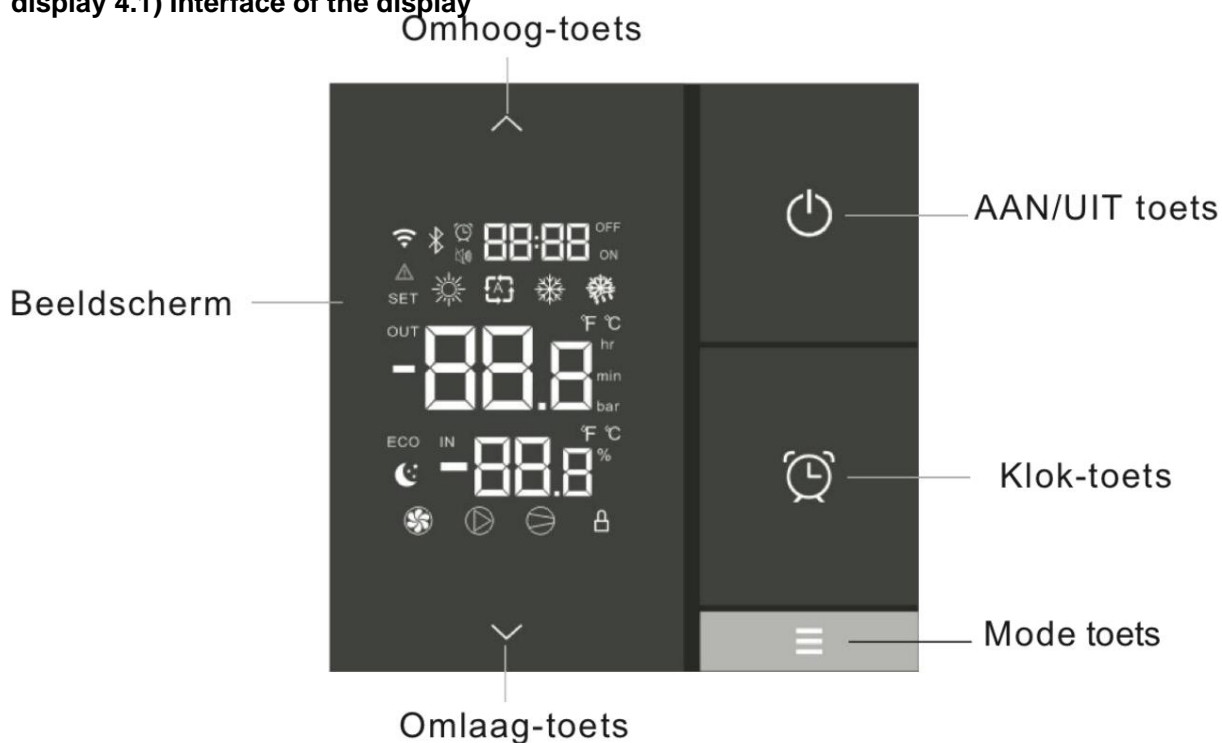
- Switch on the water pump. Check for leaks and correct flow direction.
- Switch on the heat pump by pressing the ON/OFF button on the control.
- Press the mode key so that the pump is set in heating.
- Set the requested temperature higher than the incoming temperature.
- Once the swimming pool heat pump has started up, check after a few minutes whether the air from the heat pump's fan is cooler than the ambient air.
- When the pump is running, switch off the filter pump.

Run the pump up to 24 hours a day until the desired pool temperature is reached. When the water inlet temperature that has been set is reached, the heat pump switches itself off.

The pump will restart automatically when the water temperature falls below the set temperature.












Time delay – The unit is standard equipped with a 3-minute start delay to protect the compressor circuit. This delay will automatically start the heat pump after 3 minutes after any power interruption. Even a short interruption of the voltage will activate this time delay.

**4. Instruction for use of the display 4.1) Interface of the display**



**4.2) Button and icon functions**

Button symbol	Name ON/OFF	Function
	button Use to turn on/off device, cancel current action and go to previous setting Use to set clock and change timer settings Use to set the mode, temperature setting and parameter setting	Use to set clock and change timer settings Use to set the mode, temperature setting and parameter setting
	Clock test	Up key Move up or increase a value
	Fashion test	
	Down key Move down or decrease a value	
	Cooling	Shown during cooling bath
	To heat	Displayed during bath heating
	Automatically	Shown when automatic mode is set
	Thawing	Displayed during unit defrosting
	Compressor	Displayed when the compressor is started
	Water pump	Displayed when the water pump is started
	Ventilator	Displayed when the fan is started
	Mute	When mute is activated, this symbol (flashing) is displayed.
	Timer	Displayed when the timer is activated
	Timer on/off	Displayed when the timer on/off settings are being set
	Water outlet	When the display shows the water outlet temperature, this symbol is shown

	Water inlet	When the display shows the water inlet temperature, this symbol is shown
	Lock	When the keyboard is locked, this symbol is shown
	Wrong	If an error occurs, this symbol is displayed
	Wifi symbol	When the unit is connected to a WiFi module, this symbol is displayed depending on the signal
	Bluetooth	When the unit is connected with Bluetooth, this symbol is displayed
	Degrees Celsius	When temperature is shown in degrees Celsius, this symbol is visible
	Degrees Fahrenheit	When temperature is shown in degrees Fahrenheit, this symbol is visible
	Institution	When the parameter can be adjusted, this symbol is visible
	minutes	When the display shows minutes, this symbol is visible
	Hours	When the display shows hours, this symbol is visible
	Busy	When the display indicates a pressure value, this symbol is visible

#### 4.3) Startup and Shutdown



**Note:** 1. Turning

- on/off the device can only be done in the standard interface.
2. If nothing happens for 1 minute, the display goes off. Press one any key to return to the power interface.


#### 4.4) Switching between modes

In the default interface, short press  to switch between heating  cooling  and automatically .

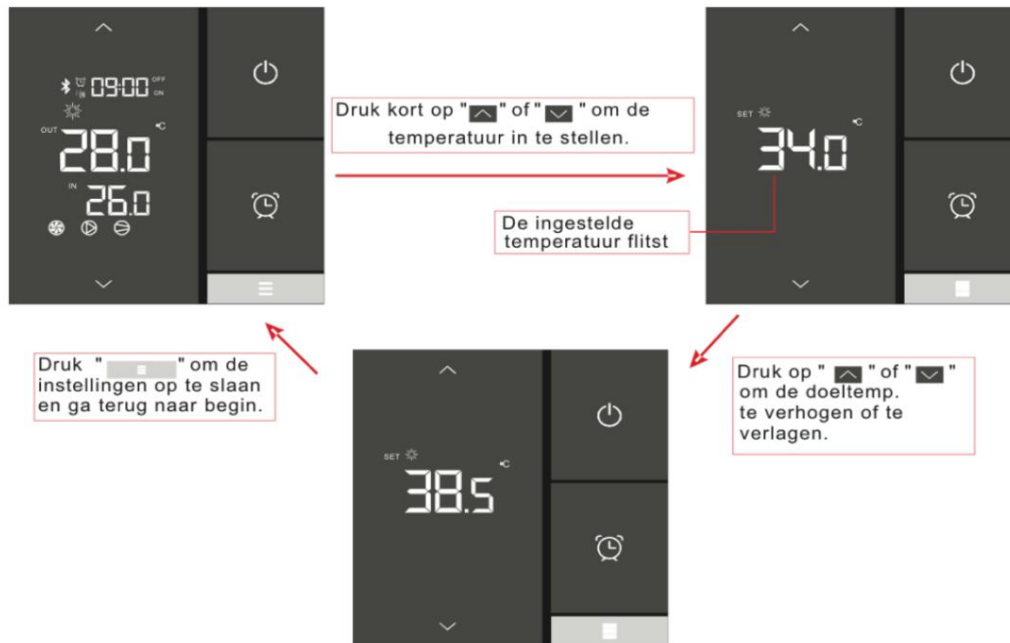


Instructions: 1)

Switching between modes can only be done in the standard interface.

2) When the unit is defrosting, the defrost symbol is  visible. 3) After defrosting is complete, the unit will automatically return to the mode it was in before defrosting.

#### 4.5) Set temperature



**Note:** When you are in the temperature interface, you can press the power button

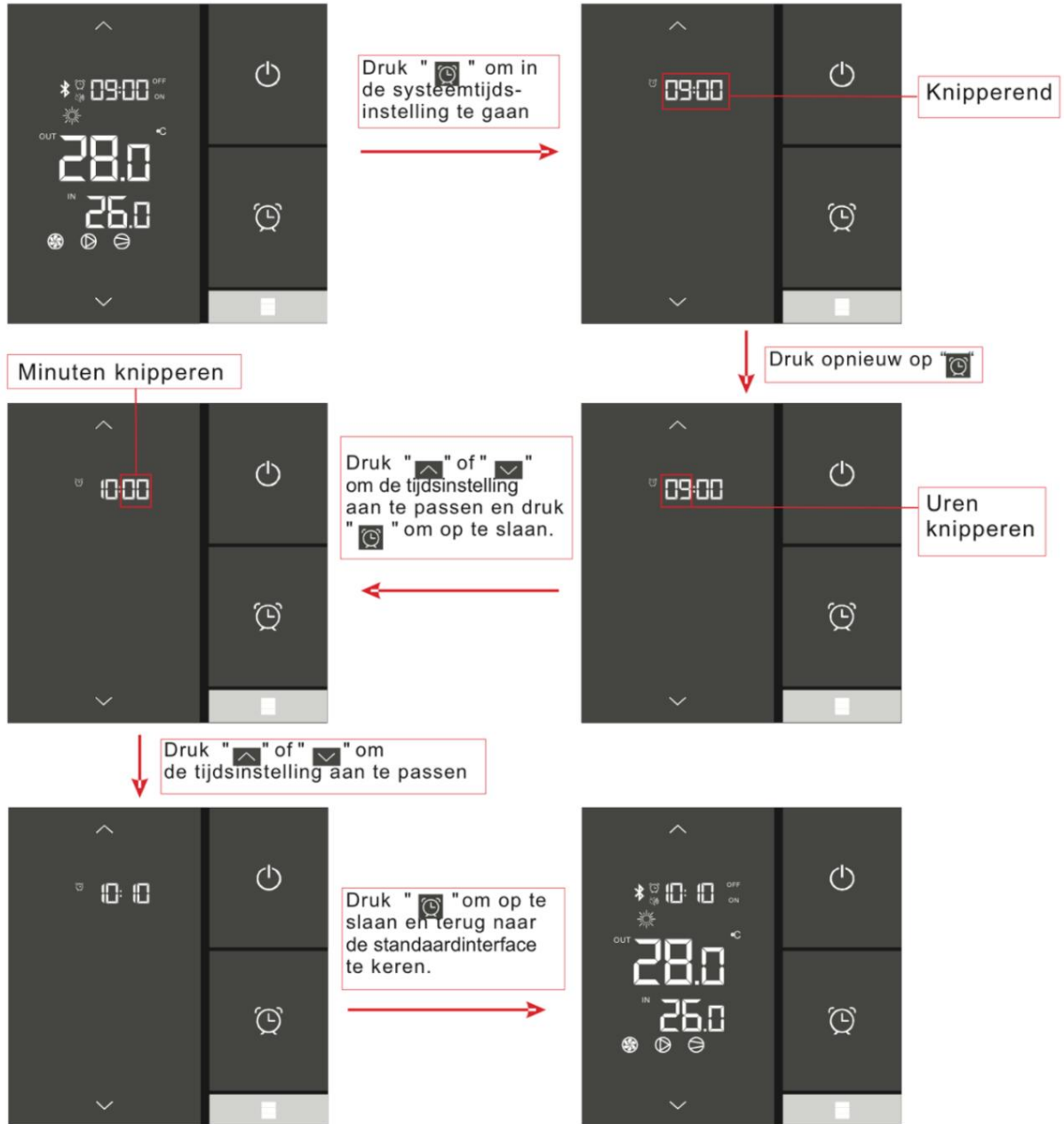


to return to the default interface without saving settings.

If no input is received for 5s, the current settings are saved and the screen returns to the standard interface.

#### 4.6) Clock settings

Setting the clock:



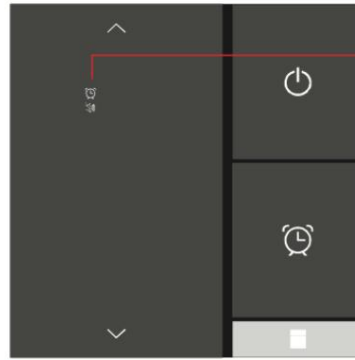
**Note:** When you are in the clock settings, you can press the power button to return to the default interface without saving any settings. If no input is received for 5s, the current settings are saved and the screen returns to the standard interface.



Choose the timer interface or the mute function:



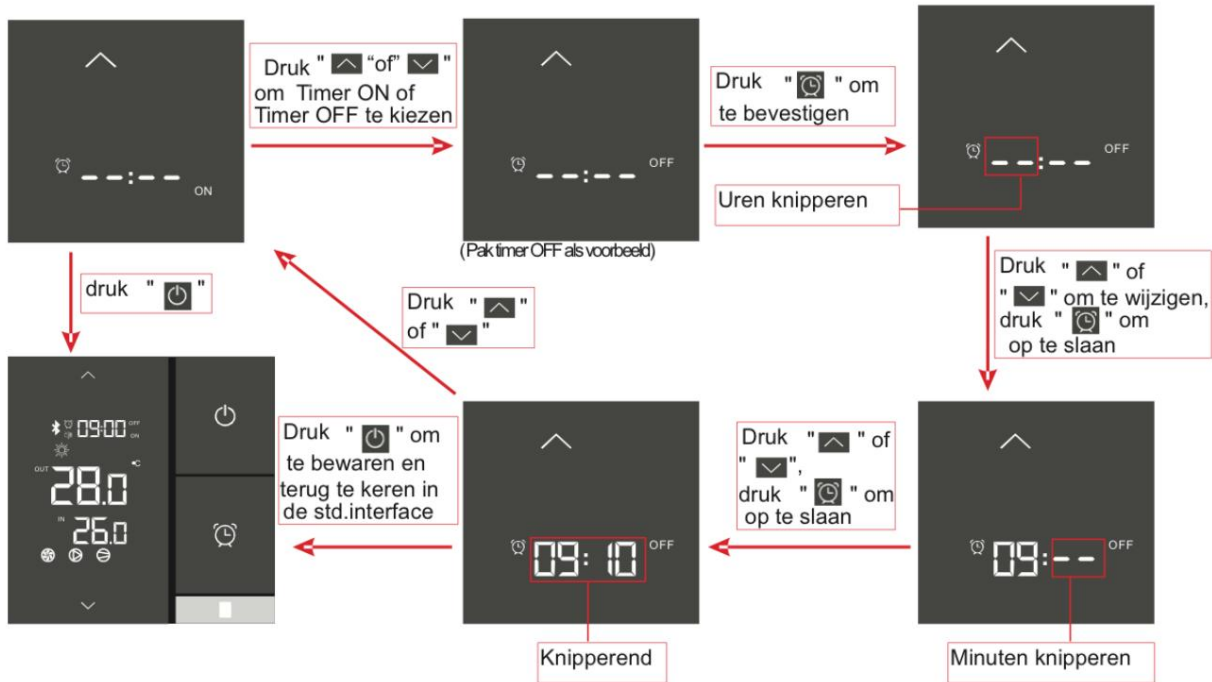
Houd toets "🕒" lang ingedrukt om de timerinterface te openen



"🕒" knippert (huidige icoon knippert)

Druk op "⬆️" of "⬇️" om de timerfunctie of de mute functie te selecteren en "🕒" om deze keuze op te slaan en naar de gekozen interface te navigeren.

Timer on/off function:



**Notes:** 1) The

Timer ON instruction refers to the Timer OFF setting.

2) If the hour or minute digits are flashing, press



to set timer ON or timer

OFF setting. It will say "--:--". Then press again and return to the default interface.

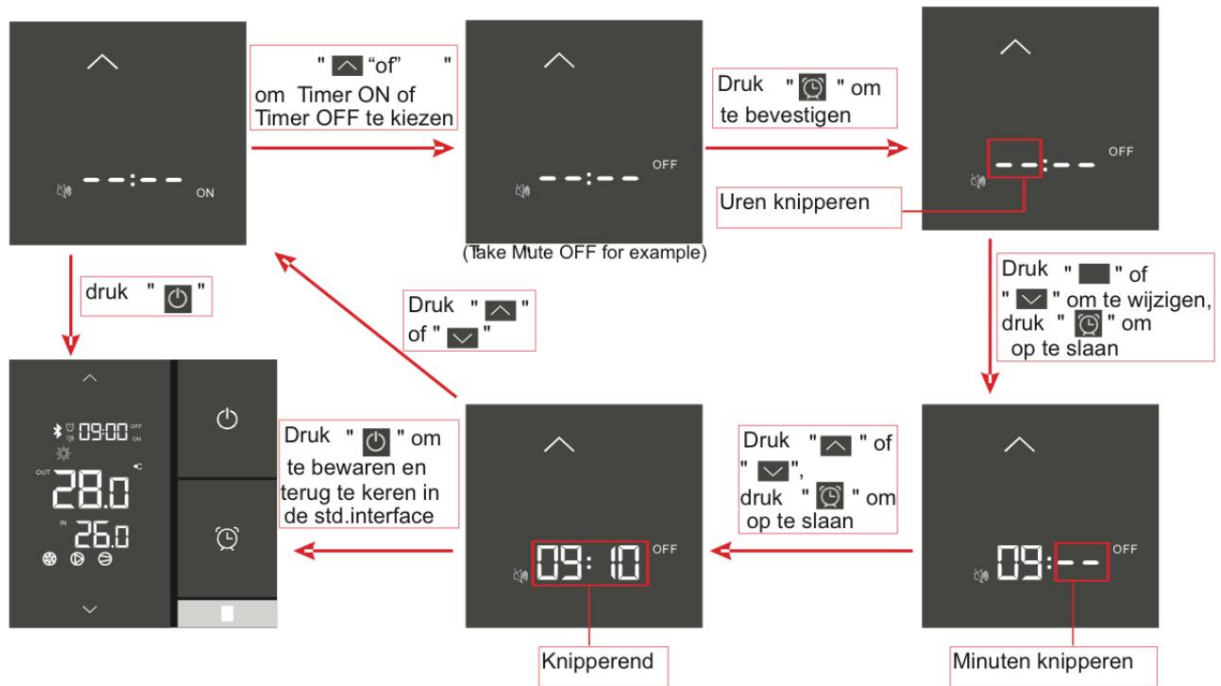


to save

3) If no input is registered for 20s, the setting is automatically saved and the display returns to the default setting.

Mute function:

Use the steps under 'choose the timer interface or the mute function' to get to the Mute menu.



**Notes:** 1) The

Mute ON instruction refers to the Mute OFF setting.

2) If the hour or minute digits are flashing, press



to set timer ON or timer

OFF setting. It will say "--:--". Then press again and return to the default interface.

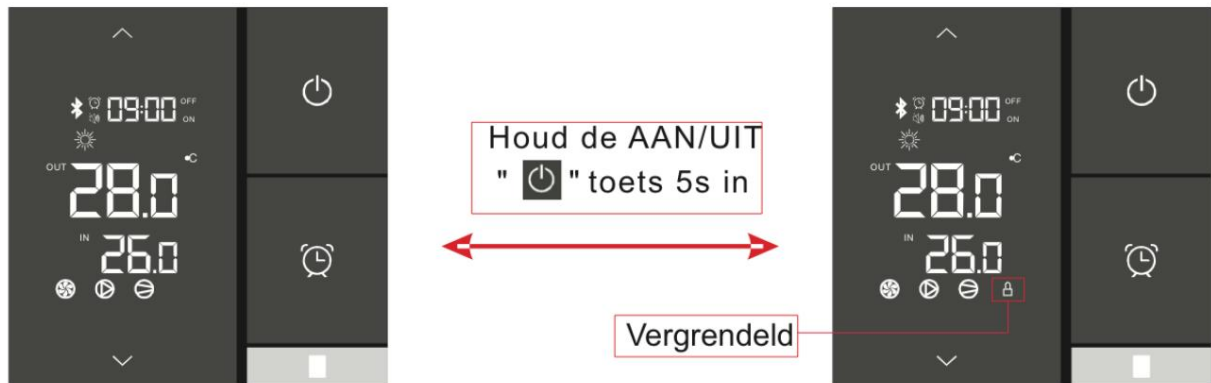


to save

3) If no input is registered for 20s, the setting is automatically saved and the display returns to the default setting.

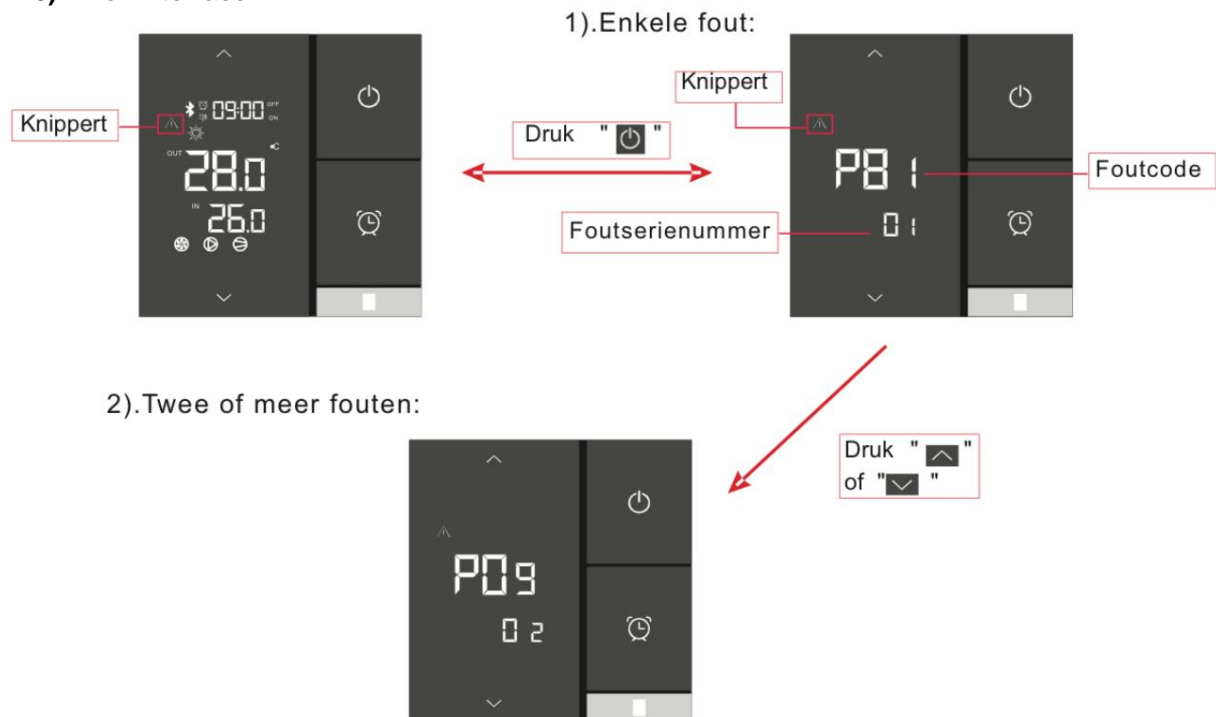


**4.7) Keypad lock** To prevent others from accidentally changing the settings, make sure that the controller is locked after changing the settings.



**Notes:** 1) When the screen is locked, the screen can only be unlocked. Once the screen is unlocked, the screen will become brighter.  
 2) When the device is in OFF mode, the screen can also be locked using the same procedure as when the device is on.

**4.8) Error interface**



**Note:** Depending on the model you own, the temperature may be displayed as  $\ddot{y}C$  or  $\ddot{y}F$ .

## 4.9) Parameter List and Explanation

wrong	error message	rode	elimination methods
standby	no		
Normal startup	no		
inlet temp. Sensor defective	P01	The temp. Sensor is broken or short circuited	Check or change the temp. Sensor
exhaust temp. Sensor defective	P02	The temp. Sensor is broken or short circuited	Check or change the temp. Sensor
Ambient temp. Sensor defective	P04	The temp. Sensor is broken or short circuited	Check or change the temp. Sensor
Coil 1 Temp. Sensor defective	P05	The temp. Sensor is broken or short circuited	Check or change the temp. Sensor
Coil 2 Temp. Sensor defective	P15	The temp. Sensor is broken or short circuited	Check or change the temp. Sensor
Suction Temp. Sensor defective	P07	The temp. Sensor is broken or short circuited	Check or change the temp. Sensor
Discharge temp. Sensor defective	P81	The temp. Sensor is broken or short circuited	Check or change the temp. Sensor
high pressure protection	E01	The high pressure switch is broken	Check the pressure switch and the cold circuit
low pressure protection	E02	Low pressure1 protection	Check the pressure switch and the cold circuit
Flow switch protection	E03	No water / little water in water system	Check the mains water flow and the water pump
antifreeze protection	E07	Water flow is not enough The	Check the pipe water flow and whether water system is jammed or not
Primary antifreeze protection	E19	ambient temp. Is low The ambient	
secondary antifreeze protection	E29	temp. Is low	
Inlet and outlet temp. too large Low temperature protection	E06	Water flow is not enough and low differential pressure The ambient temp. is low	Check the tap water flow and whether water system is stuck or not
Compressor overcurrent protection	E51	The compressor is overload	Check that the compressor system is operating normally
Exhaust air overtemp. Protection	P82	The compressor is overload	Check that the compressor system is operating normally
Communication error	E08	Communication failure between wire controller and motherboard	Check the wire connection between remote wire controller and main board
Antifreeze Temp. Sensor defective	P09	antifreeze temperature sensor is broken or shorted	check and replace this temperature sensor
Waterway Anti-freezing protection E05		water temp. or ambient temp. is too low	
Fout feedback EC-ventilator	F51	Something is wrong with the fan motor and the fan motor stops rotating	Check whether the fan motor is faulty or locked or not
Pressure sensor error	PP	The pressure sensor is	Check or replace the pressure sensor or pressure
Storing ventilatormotor 1	F31	broken 1. Motor is in the condition of the rotor locked 2. the wire connection between DC fan motor module and ventilator motor makes bad contact	1 Replace a new fan motor 2.Check the wire connection and make sure they have good contact
Low AT protection	TP	Ambient temperature is too low	
Storing ventilatormotor 2	F32	1. Engine is in the condition of the rotor locked 2. the wire connection between DC fan motor module and fan motor makes poor contact	1 Replace a new fan motor 2.Check the wire connection and make sure they have good contact
Communication error (speed control module)	E81	Speed control module and main board communication failed	Check the communication link

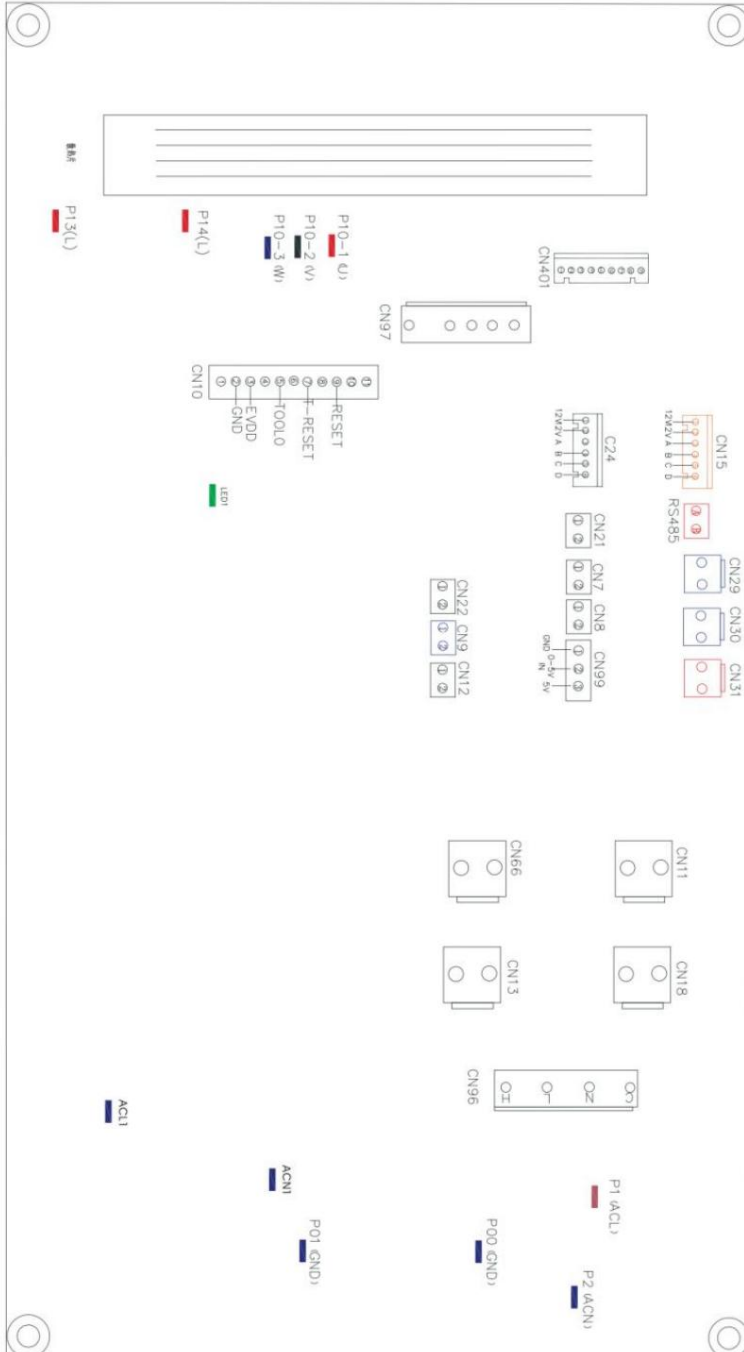
**Frequency conversion board error code list:**

wrong	error message	rode	elimination methods
Drv1 MOP-alarm	F01	MOP disk alarm	Recovery after the 150s
Inverter offline	F02	Frequency conversion board and main board communication error	Check the communication link
IPM protection	F03	IPM modular protection	Recovery after the 150s
Comp. Driver failed	F04	Lack of phase, step or drive hardware damage	Check the measurement voltage control hardware for conversion card
Fout DC-ventilator	F05	Motor current feedback open circuit or short circuit	Verify current return wires connected engine
IPM overstrom	F06	IPM input current is large	Check and adjust the current measurement
Inv. DC overvoltage	F07	DC bus voltage > DC bus over voltage protection value	Check the input voltage measurement
Inv. DC minder spanning	F08	DC bus voltage > DC bus over voltage protection value	Check the input voltage measurement
Inv. Input Lessvolt.	F09	The input voltage is low, so the input current is high	Check the input voltage measurement
Inv. Input over voltage.	F10	The input voltage is too high, more than failsafe current RMS	Check the input voltage measurement
Inv. Sampling Volt.	F11	The sampling error of the input voltage	Check and adjust the current measurement
Comm. Fout DSP-PFC	F12	DSP and PFC connection error	Check the communication link
Input via Cur.	F26	The equipment load is too great	
PFC-fout	F27	The PFC circuit protection	Check the PF C switch and leave circulating or not
IPM Overheating	F15	The IPM module has overheated	Check and adjust the current measurement
Weak magnetic warning F16		The magnetic force of the compressor is not enough	
Inv. Input out of phase	F17	The input voltage lost phase	Check and measure the voltage adjustment
IPM Sampling Cur.	F18	IPM electricity sampling is wrong	Check and adjust the current measurement
Inv. temp. Probe failed	F19	Sensor is short or open circuit	Inspect and replace the sensor
Inverter overheating	F20	The transducer has overheated	Check and adjust the current measurement
Inv. Warn overheating	F22	Transducer temperature is too high	Check and adjust the current measurement
Comp. AboutCur. Warning	F23	The electricity of the compressor is large	The compressor overflow protection
Input About Cur. Warning	F24	Input current is too large	Check and adjust the current measurement
EEPROM error message	F25	MCU error	Check if the chip is damaged Replace chip
V15V over/under voltage fault	F28	The V15V is overloaded or undervoltage	Check V15V input voltage within range 13.5v-16.5v or not

**Parameter list**

Meaning	Standard	Comments
Cooling target temperature set point	27ÿ	Customizable
Heating the target temperature set point	27ÿ	Customizable
Automatic set point of the target temperature	27ÿ	Customizable

**4.10) Main board interface diagram**



Number Sign		Meaning
01	P10-(U)	Compressor ( output 220-230VAC)
02	P10-(V)	
03	P10-(W)	
04	CN18(EMV)	Water pump ( output 220-230VAC) 4-
05	CN13(HEAT)	way valve ( output 220-230VAC)
06	CN96(H)	High speed of fan ( output 220-230VAC)
07	CN96(L)	Low speed of fan (output 220-230VAC)
08	P1(AC-L)	Live wire ( input 220-230VAC)
09	P2(AC-N)	Neutral wire ( input 220-230VAC)
10	CN99(PL)	Pressure sensor
11	CN29(OVT)	Water flow switch (input)
12	CN30(HP)	High pressure switch (input)
13	CN31(LP)	Low pressure switch (input)
14	CN7(OAT)	System suction temperature (input)
15	CN21(RES1)	Water input temperature (input)
16	CN22(RES2)	Water output temperature ( input )
17	CN8(OPT)	System fan coil temperature( input)
18	CN12(PH)	Ambient temperature( input)
19	CN9(OHT)	System Exhaust temperature (input)
20	P00(GND)	Earth wire
21	P01(GND)	Earth wire
22	P13(L) P14(L)	Electric reactor
23	R485(B) R485(A)	Color line controller communication
24	CN15	Electronic expansion valve

## **5) Maintenance and Inspection**

### **Repairs to sealed components** During repairs

to sealed and sealed components, the power supply must be completely switched off, including the surrounding equipment.

If it is absolutely necessary to have an electrical supply during maintenance work, a permanent leak detector must be connected and active.

This must measure at the most critical points in the installation to warn of a potentially dangerous situation.

Particular care must be taken when working on electrical components that the housing is not modified in such a way that the level of protection is affected.

This includes damage to cables, excessive number of connections, connections not made to original specification, damage to seals, incorrect connection of connections, etc.

Make sure the device is securely attached.

Ensure that seals or sealing materials do not deteriorate beyond their ability to prevent the ingress of flammable gases such as R32.

Replacement parts must be in accordance with the manufacturer's specifications.

NOTE: The use of silicone caulk may reduce the effectiveness of some types

reduce leak detection equipment. Intrinsically safe components do not need to be isolated beforehand.

**Repairs to Intrinsically Safe Components** Do not apply permanent inductive or capacitance loads to the circuit without ensuring that it does not exceed the rated voltage and current allowed for the equipment in use.

Intrinsically safe components are the only types that can be worked on while present in the vicinity of a flammable atmosphere.

The test device must have the appropriate qualification.

Replace components only with those specified by the manufacturer.

Other parts can lead to the ignition of refrigerant during a leak.

### **Cabling**

Check that the cabling is not subject to wear, corrosion, excessive pressure, vibration, sharp edges or other adverse effects. The check should also take into account the effects of aging or continuous vibration from sources such as compressors or fans.

### **Detection of flammable refrigerants**

Under no circumstances should potential sources of ignition be used in detecting or detecting refrigerant leakage.

A halogen torch (or any detector using an open flame) should never be used. \_\_\_\_\_

### **Leak Detection**

**Methods** The following leak detection methods are considered acceptable for systems containing flammable refrigerants.

Electronic leak detectors are used to detect flammable refrigerants, but the sensitivity may not be adequate or may require recalibration. (Detection equipment must be calibrated in a refrigerant-free room.)

Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment should be set to a percentage of the LFL of the refrigerant and calibrated to the refrigerant used to confirm the correct percentage of gas (up to 25%). Leak detection fluids are suitable for use with most refrigerants, but cleaners containing chlorine should be avoided as the chlorine may react with the refrigerant and corrode copper pipework.

If a leak is suspected, all naked flames must be immediately removed and extinguished!

If a refrigerant leak requiring brazing is found, all refrigerant in the system must be recovered or isolated (using isolation valves) in a part of the system remote from the leak.

Oxygen Free Nitrogen (OFN = Oxygen Free Nitrogen) is then flushed through the system both before and during the soldering process.

Check the water supply and connection regularly.

Air entering the system must be prevented at all times, as this will affect the performance and reliability of the device.

You should regularly clean the pool/spa filter to prevent damage to the unit and filter.

The location around the device must be dry, clean and well ventilated.

Clean the inside of the heat exchanger regularly to ensure proper heat exchange and to save energy.

The working pressure of the refrigeration system may only be checked and maintained by a certified refrigeration engineer.

Check the power supply and cabling regularly.

If the device starts operating abnormally, disconnect the power source and Contact a certified installer.

### **In winter and cold environments**

Remove all water in the pump and pipes so that freezing of the water in the pump or in the pipes can occur. The water should be drained from the bottom of the heat pump/heat exchanger if the unit is not used for a long period of time.

The appliance should be thoroughly checked and the system correctly filled with water before first use after a longer period of inactivity.

Check that no air or air bubbles remain in the system.

### **Disposal and disposal**

When opening the refrigerant circuit, eg to carry out repairs, the applicable procedures must be respected.

This is very important as this is a flammable refrigerant.

The refrigerant charge must be recovered in the appropriate recycle cylinders.

The system must be "flushed" with OFN to make the device safe.

This process may need to be repeated several times.

Compressed air or oxygen should not be used for this task.

Purging will be achieved by breaking the vacuum in the system with OFN and continuing to fill until working pressure is reached.

This process must be repeated until there is no refrigerant in the system.

When the last OFN charge is used, the system is vented to atmospheric pressure to allow work on the plant.

This operation is absolutely necessary if brazing work is to be carried out on the piping.

Make sure that the exhaust for the vacuum pump is not near sources of ignition and that there is adequate ventilation during the work.

### **Labeling**

Equipment must be labeled stating that it has been commissioned and refrigerant emptied. The label must be dated and signed.

Make sure the equipment has labels stating that the equipment contains flammable refrigerant.

**Recovery** When removing refrigerant from a system, either for maintenance or decommissioning, it is recommended that all refrigerants be safely removed.

When transferring refrigerant to cylinders, ensure that only suitable recycle cylinders are used.

Make sure that the correct number of cylinders are available for pump-down.

All cylinders to be used are for R32 refrigerant recovery and labeled

Cylinders must be complete with pressure relief valve and associated shut-off valves and in good condition.

Empty recycle cylinders are temporarily removed and/or disposed of.

The tools/equipment to be used must be in good condition, certified, and suitable for use with the flammable refrigerant present.

In addition, a calibrated scale must be available.

Hoses must be complete with leak-free couplings and in good condition.

Before using the recycler, make sure it is in good working order, has been properly maintained, and that all associated electrical components are sealed to prevent ignition in the event of a refrigerant release.

If in doubt, consult the manufacturer.

The recovered refrigerant is returned to the refrigerant supplier in the appropriate recycle cylinder.

### **Disposal and Dismantling**

Before carrying out this procedure, it is essential that the technician is thoroughly familiar with the equipment and all its details.

It is recommended that all refrigerants be safely recycled and disposed of.

It is essential that electrical power is available before starting the job.

- a) Familiarize yourself with the equipment and its operation.
- b) Electrically isolate the system.
- c) If a vacuum is not possible, create a manifold so that refrigerant can be removed from different parts of the system.
- d) Ensure the cylinder is on the scale prior to recycling.
- e) Start the work in accordance with applicable guidelines and certificates.
- f) Do not overfill the cylinders. (Not more than 80% volume of liquid cargo).
- g) Do not exceed the maximum working pressure of the cylinder, even temporarily.

### **Filling the system with R32 refrigerant**

In addition to the usual filling procedures, the following must be followed.

- Make sure that no contamination from various refrigerants occurs when connecting and filling your equipment.  
Hoses or lines should be as short as possible to minimize the amount of refrigerant contained.
- Cylinders must be kept upright. • Be sure to ground the cooling system before charging the system with refrigerant. • Label the system when it is filled and complete (if not already done). • Extreme care must be taken when overfilling the cooling system.

Before refilling the system, it should be pressure tested with OFN.

The system shall be leak tested upon completion of filling but prior to commissioning.

A post leak test should be performed prior to leaving the site.

The safety wiring is 5 x 20\_5A / 250VAC, and must meet explosion-proof requirements.



**Appendix****Cable specifications****1-Fase - 230V**

Tag device maximum Included assets	Phase(s)/Null	Earth	Afzeker value	Creepage protector	Communication cable		
< 10A	2x 1,5 mm <sup>2</sup> +N 1,5 mm <sup>2</sup>	10 t/m	20A	30mA less than 0,1 sec.	nx 0,75 mm <sup>2</sup> Shielded		
16A	2x 2,5 mm <sup>2</sup> +N 2,5 mm <sup>2</sup>	16 t/m	25A	30mA less than 0,1 sec.			
4,0 mm <sup>2</sup> +N 4,0 mm <sup>2</sup>	25 t/m	32A	2x 6,0	40A		30mA less than 0,1 sec.	
mm <sup>2</sup> +N 6,0 mm <sup>2</sup>				40A		30mA less than 0,1 sec.	
32 t/m	40A 2x 10,0 mm <sup>2</sup> +N 10,0 mm <sup>2</sup>	40 t/m		63A		30mA less than 0,1 sec.	
63A	2x 16,0 mm <sup>2</sup> +N 16,0 mm <sup>2</sup>	63 t/m	75A	2x		80A	30mA less than 0,1 sec.
25,0 mm <sup>2</sup> +N 25,0 mm <sup>2</sup>	75 t/m	101A	2x 25,0			100A	30mA less than 0,1 sec.
mm <sup>2</sup> +N 25,0 mm <sup>2</sup>	101 t/m	123A	2x 35,0 mm <sup>2</sup> +N			125A	30mA less than 0,1 sec.
35,0 mm <sup>2</sup>	123 t/m	148A	2x 50,0 mm <sup>2</sup> +N 50,0			160A	30mA less than 0,1 sec.
mm <sup>2</sup>	148 t/m	186A	2x 70,0 mm <sup>2</sup> +N 70,0 mm <sup>2</sup>			225A	30mA less than 0,1 sec.
186 t/m	224A 2x 95,0 mm <sup>2</sup> +N 95,0 mm <sup>2</sup>					250A	30mA less than 0,1 sec.
						280A	30mA less than 0,1 sec.

**Comparison table of refrigerant saturation temperature**

Busy (MPa)	0 0.3	0.5	0.8	1	1.3	1.5	1.8	2	2.3
Temperature (R410A)(°C)	-51.3 -20 -9			11 19		24	31	35 39	
Temperature (R32)(°C)	-52.5 -20 -9		3.5 10 18 23	29.5 33.3 38.7					
Busy (MPa)	2.5 2.8	3	3.3 3.5 3.8		4	4.5	5	5.5	
Temperature (R410A)(°C)	43 47	51 55	57 61		64	70 74		80	
Temperature (R32)(°C)	42 46.5	49.5 53.5 56 60	62 67.5 72.5 77.4						



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