BRITISH ENGLISH

User manual

Air/water heat pump

BONUS AIR 10



Invest Living
Scandinavian heat pumps

Foreword

Congratulations on your new product from Invest Living Scandinavia AB!

You have made a wise investment and should now ensure that you obtain a good installation for many years of satisfaction, comfort and economical energy. Invest Living Scandinavia AB thanks you for choosing our product. We know from experience that a correctly assembled and installed heat pump product provides you with optimal energy recovery, problem-free operation and a long service life for the product. We therefore ask that you do not try to “cut corners” in the installation and ensure that you engage skilled professionals with the right qualifications. You will benefit from this in the long run!

We provide generous warranties for your new product, however, these presuppose that installation, service, documentation and registration are performed correctly, so read the accompanying documentation carefully. The warranty conditions vary from country to country, our warranty conditions apply to Sweden, as well as to Denmark, Norway and Finland to some extent, where the requirements that only certified refrigeration engineers are permitted to install or work on refrigerant systems can be verified equivalently to applicable requirements and rules in Sweden.

Please read through the entire manual before the product is in put into operation, and follow the instructions carefully to avoid personal injury and material damage.

Optimum location for your new heat pump.

Whether you purchased a so-called split-model heat pump (i.e. with a gas pipe installed between an outer and inner part) or a monoblock (complete heat pump unit air/water outside), the location of the external section is important. It is here that energy is derived from the exterior air. Energy that the heat pump process converts into comfortable and convenient indoor heat.

The heat pump should be located so that it is not subject to constant wind, in particular so that there is not too much wind between the rear of the heat pump and the wall of the house. A warm and dry location provides better operating conditions than a location that is cold and damp.

In heat mode, outdoor air is cooled in the heat pump’s external part, which then forms condensation. Bear in mind that condensate must be able to flow away from the machine.

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1. Before use

1.1 Safety instructions

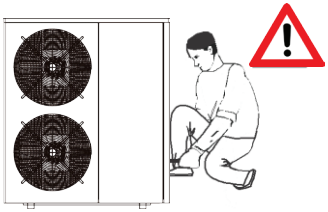
Check that the following accessories are included in the pack.

BONUS AIR 10 List of accessories		
Designation	**Qty**	**Remarks**
User manual	1 pcs	Installation and operating instructions.
Control panel	1 pcs	To mount in a suitable location.
Drainage pipe and a pipe bend	2 (1) pcs	To conduct water away from the unit. **NB**. The pipe freezes easily in the winter, we recommend that it is not used.

Safety instructions

Symbols that are used

Warning! Not permitted Recommendation



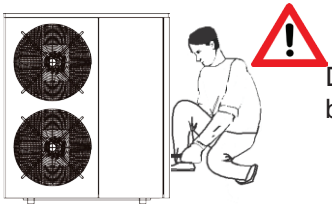
Installation, dismantling and maintenance of the unit may only be undertaken by qualified service personnel. Making changes in the structure of the unit is not permitted. It can cause personal injury or damage to the unit.

If the unit is installed when the temperature is BELOW **0°C**. the compressor/unit **MUST** be connected to a power supply for **AT LEAST** 2 hours before starting the unit. This is to ensure that the compressor is not frozen.

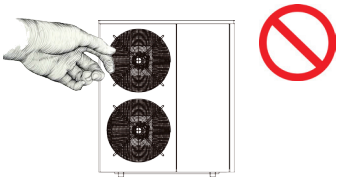
The water inside the heat exchanger should not contain chloride ions and the pH-value should be between 6-8 pH.

1. Before use

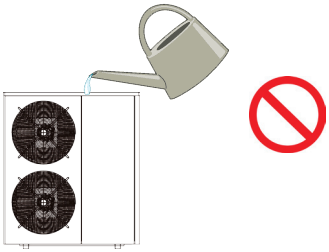
1.1 Safety instructions



Disconnect the power to the heat pump before inspecting or working on the unit.



Do not move the ventilation grille while the fan is running.



Avoid water directly on electrical components. It can cause a short circuit.



Do not block the evaporator with paper or other objects, ensure that the unit is well ventilated.



IMPORTANT!
A safety switch must be connected to the heat pump. Check carefully that the amperage corresponds to the specifications on the unit's rating plate.

Use a separate electric circuit for the heat pump's power supply.

1. Before use

1.2 Functions and benefits

- This heat pump uses the latest technology. The working frequency can be adapted so that the output corresponds with the charge. It also works well at cold temperatures.
- The unit is simple to install. It is ideal for small and large houses.
- The unit uses the environmentally-friendly refrigerant R410A, which is one of the most energy-efficient media on the market. The compressor's output and input power requirements are monitored and continually adapted to achieve an optimal level for the prevailing outdoor and indoor conditions, and according to the user's requirements for the system.
- The software in the microprocessor's control system has several functions that make the system's operation as beneficial and agreeable as possible as the weather conditions change.
- The compressor's specially designed vibration absorber makes the whole system extremely quiet. One of the quietest on the market.
- The unit is equipped with a soft start relay which means that it starts smoothly every time, thus delivering lower power consumption.
- The automatic restart function saves all settings in its memory and automatically resumes operation after a power cut.
- The compressor's crankcase and the base plate's heating element are standard for extremely cold weather conditions, and these enable the unit to function at very low temperatures with a markedly reduced defrosting frequency. Both these heating elements are controlled electronically based on the outdoor temperature and an advanced defrosting logic.
- The heat exchanger's acrylic-coated aluminum fins increase the resistance to corrosion and make it easier for rainwater to run off. The heat exchanger also defrosts more quickly.
- The copper pipe in all heat exchangers is of the latest technology. Increasing the area of the pipe in a smaller, more compact casing, increases the efficiency of the heat exchange.

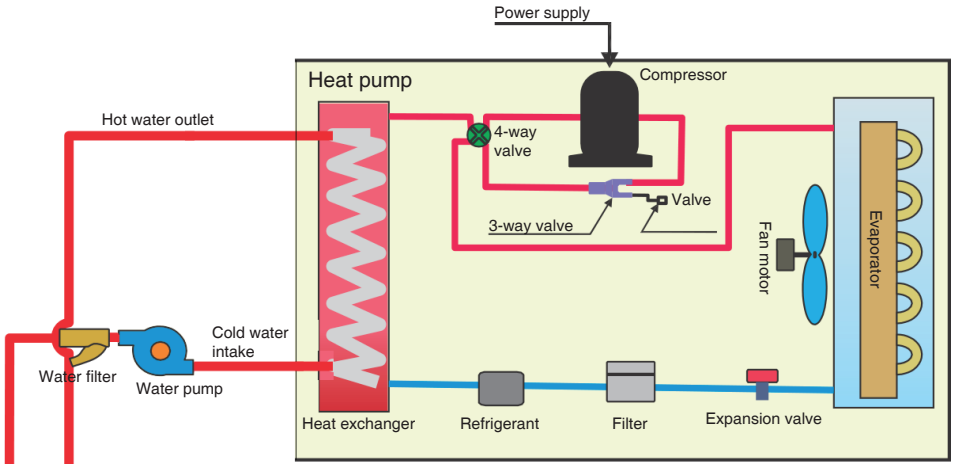


- Use a certified and trained technician for installation, service and maintenance.

1. Before use

1.3 Working principle

Heat pumps are complicated pieces of technical equipment.
A heat pump utilizes a refrigeration process so that it can transfer thermal energy from the exterior air to circulating hot water in your house. The refrigerant absorbs thermal energy through what is called evaporation, this takes place in the heat pump's external section. The refrigerant in gas form is subsequently compressed in a compressor and conveyed in for condensation in the heat exchanger.
During condensation, energy is transferred to the house's heating system consisting of water circulating in radiators, underfloor heating system, water heater, any existing boiler etc. In essence, all houses have unique heating systems, structured in different ways. Depending on what you have, the heat pump can be connected in various ways to obtain optimum operating conditions and thereby the best operating economy, comfort and service life.
In this manual we have chosen to illustrate and describe 3 effective alternative types of installation.



1. Before use

1.4 Specification

COP:	4.52	
Energy class:	A	
Outside temp. / water temp.:	**Power IN / OUT(W)**	**COP**
7 °C / 35 °C:	2 355 / 10 640	4.52
2 °C / 35 °C:	2 112 / 8 080	3.83
-7 °C / 35 °C:	1 900 / 5 120	2.69
7 °C / 50 °C:	2 580 / 9 900	3.84
2 °C / 50 °C:	2 270 / 7 880	3.47
-7 °C / 50 °C:	2 085 / 5 060	2.43
Voltage (V):	380-415V 50Hz 3P	
Fuse (A):	16	
DIMENSIONS & WEIGHT		
Height (mm):	1285	
Width (mm):	1117	
Depth (mm):	425 (485 measured incl. feet)	
Weight (kg):	140	
SPECIFICATION		
Air flow fan (normal/max) (m^3/h)	2 250/2 650	
Power consumption fan motor (nor/max) (W):	185/225	
Max. sound level fan (dB):	52	
Compressor (manufacturer/type):	Daikin / Scroll	
Refrigerant (type/weight):	R410A / 1 800g	
Protection class:	IPX4	
Recommended water flow (l/s):	0.25-0.4	
Max supply temperature (°C):	65	
Outdoor temperature (min/max) (°C):	-25 till 50	
Water connection (inches/mm):	3/4 / 20	
Adapted for Nordic conditions:	YES	
Automatic restart function:	YES	

1. Before use

1.5 Components

All components in Bonus AIR 10 have been tested over a long period at our test and development centre in Kangos, Kiruna. This ensures that you obtain a reliable and energy-efficient air/water heat pump that can cope with our Nordic climate.

Scroll compressor



Manufacturer

- DAIKIN

Advanced technology

- High efficiency to reduce energy consumption
- Low sound level for quieter operation
- Reliable for long service life

Technical information

- R410A
- 380-415 V 50 Hz 3 p

Plate heat exchanger



Manufacturer

- SWEP

Reliability

- Special gasket and stainless steel prevents corrosion damage

Compact design

- Intelligent format and frame design saves on material and space

High efficiency

- Large area and high liquid flow passage for high heat transfer

Temperature sensors



Manufacturer

- Shibaura

Reliability

- Epoxy-coated element with protective cover
- Insulated conduit wire for better weatherproofing

Flow indicator



Manufacturer

- SIKA

Technical information

- Long-term stable set point
- Fiberglass-reinforced plastic guarantees high level of stability

Expansion valve



Tillverkare

- DANFOSS

Technical information

- Compact size enables simple installation and minimal space
- Hermetically leak-free construction
- Fine thread for set point adjustment, easy to calibrate

High/Low pressure switch



Manufacturer

- Guangzho Electric

Operating range

- High pressure 3.5 - 4.0 Mpa
- Low pressure 0.05 - 0.15 Mpa

Heat cable, adapted to Nordic conditions



Manufacturer

- Guangzho Electric

Location

- Around the compressor and heat exchanger.
- On base plate and below the evaporator

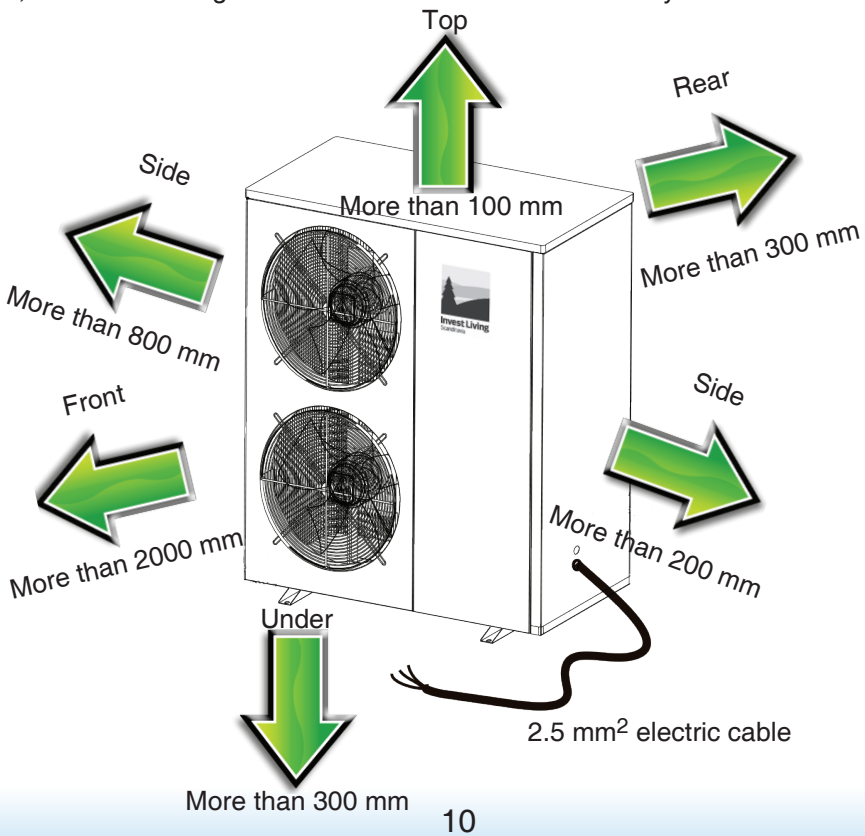
2. Installation

2.1 Location

Optimum location for your new heat pump.
Whether you purchased a so-called split-model heat pump (i.e. with a gas pipe installed between an outer and inner part) or a monoblock (complete heat pump unit air/water outside), the location of the external section is important. It is here that energy is derived from the exterior air.Energy that the heat pump process converts into comfortable and convenient indoor heat.

Bear in mind to locate it at least 30 - 50 cm above the ground and that it should have a wall or similar 30 cm behind it. Use a ground mount or a wall bracket for this. The heat pump should be located so that it is not subject to constant wind, in particular so that there is not too much wind between the rear of the heat pump and the wall of the house. A sunny, warm and dry location obviously provides better operating conditions than a location that is dark, cold and damp.

In heat mode, outdoor air is cooled in the heat pump's external part, which then forms condensation. Bear in mind that condensate forms ice below the heat pump in the winter, check this at regular intervals and remove if necessary.



2. Installation

When the unit is in place.
Remove the cargo net and wire mesh on the back of the machine
This is transportation protection for the evaporator.

2.2 Making holes / connection

1. It is important to use PEX hose as it can expand in the event of any freezing.
2. Insulate all pipes and cables after fitting.
3. Make 2 holes in the external wall of approx. 70 mm so that you can fit the PEX hose through, including the insulation and cables.
4. Locate the heat pump as close to the hole as possible, the smaller the hose that is located on the outside the better.
5. Use a safety switch for the installation.
6. Ensure that the heat pump has space around it, as in the illustration on the previous page.
7. It is a good idea to fit a roof over the heat pump.
8. Electricity must be connected by a professional.
9.



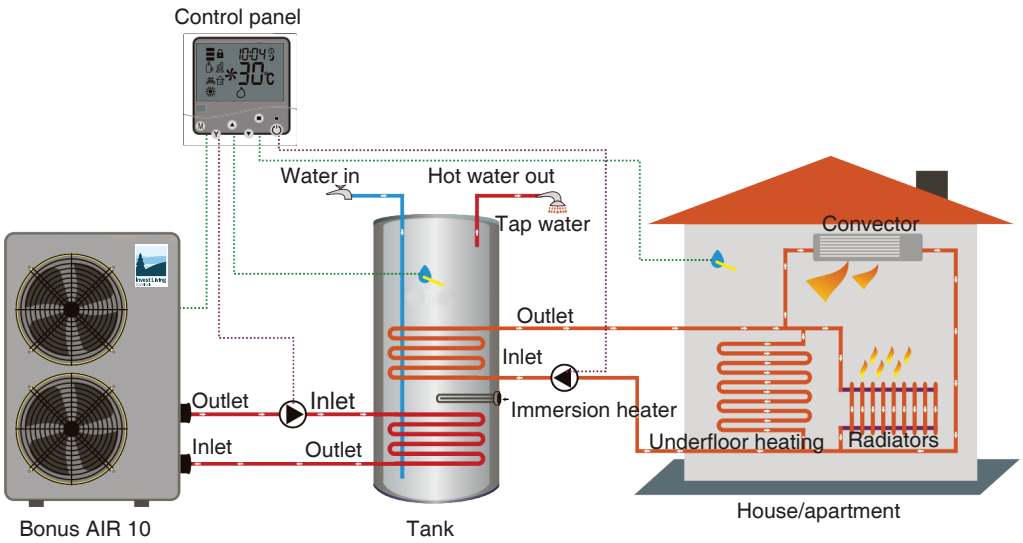
If the unit is installed when the temperature is BELOW **0°C**.
the compressor/unit **MUST** be connected to a power supply
for **AT LEAST** 2 hours before being started.
This is to ensure that the compressor is not frozen.

2. Installation

2.3 Connection principle

Invest Living Bonus Air 10 is a so called ”monoblock” heat pump. This means that a single ”block” contains complete equipment for production of heat for your house. The heat pump utilizes the refrigerant R410A for heat production – however, installation of the heat pump does not involve any intervention in this refrigerant circuit and thus does not require any assistance from a certified refrigeration engineer.

In all situations, a heat pump works best in a low temperature system (for example with underfloor heating, fan coil units or a large number of water radiators). In heating systems that are dimensioned for higher temperatures, there is an increased need for so-called peak heat load, at the same time as the temperature in the return pipes can produce operating conditions that are unfavorable for the heat pump. This is an important fact to consider in your choice of type of installation, see below.



Have you got an existing boiler/heating installation?
If you have an existing heating installation – installation of your new Invest Living Bonus Air 10 will only affect the actual heating system. Connection of your new heat pump to the heating system in your house is extremely simple and can take place in various ways, depending on which existing equipment you have and which solution you prefer. Here is a description of 3 different types of installation, study them carefully and discuss with your plumber. Our recommendations aim to give you the greatest possible savings and service life in your new installation.

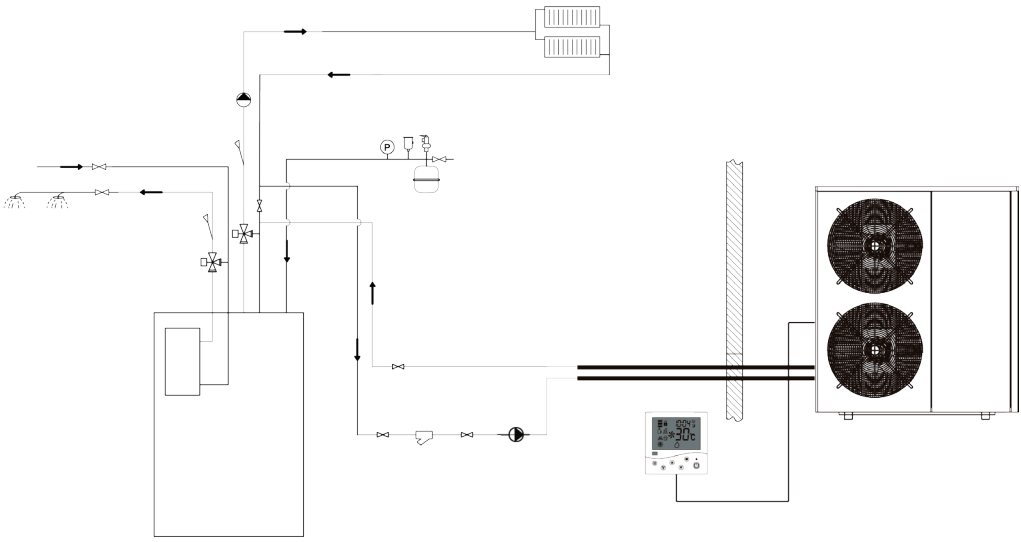
2. Installation

2.4 Installation types

1. Connecting return pipe

In cases where you already have a boiler with built-in water heating, the connection can be performed extremely simply and effectively. The existing heat system's return pipe (i.e. after the final radiator) is installed via your new heat pump and then back to the return pipe. This type of installation provides the very best conditions for optimum heat pump operation (so called floating condensation). Note that in this alternative the heat pump does not contribute to heating hot water in the house.

With this type of installation the heat pump is controlled through a room thermostat. The boiler's automatic shunt is in turn controlled by its own room thermostat and is set 1ºC lower than the heat pump's room thermostat. This means that for heating purposes the boiler only starts in those situations when the heat pump does not have capacity for the relevant heating requirement.



See appendix 5.3 on page 29 for legend.
Also available to download at www.investliving.se

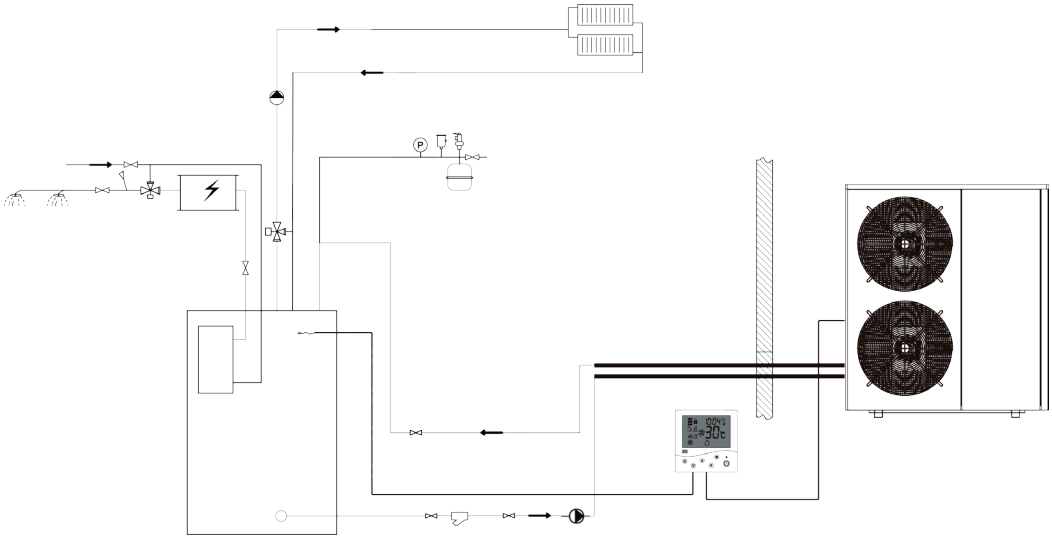
2. Installation

2.4 Installation types

2. Direct connection to boiler

In cases where you wish to run your existing boiler concurrently with water heating and your new heat pump, we recommend that you connect the heat pump directly to the boiler. Heated water from the heat pump is conveyed into the boiler's top section, the heat is emitted to the boiler and subsequently conveyed from the colder bottom of the boiler back to the heat pump. The heat pump provides an effective contribution (through so-called "firm condensation") for both heating and hot water. Water heating has to be supplemented with an external water heater for "peak" hot water temperature.

Note that if you have an existing manual shunt valve on your boiler, you need to supplement this with a temperature limiter, or alternatively replace this with an automatic motor shunt in order to avoid too high water temperatures in the heat pump. With this type of installation, the heat pump is controlled through a temperature sensor located in the boiler. The heat pump then moves towards a given preset temperature that is selected based on the operating conditions.



See appendix 5.4 page 30 for legend.
Also available for download at www.investliving.se

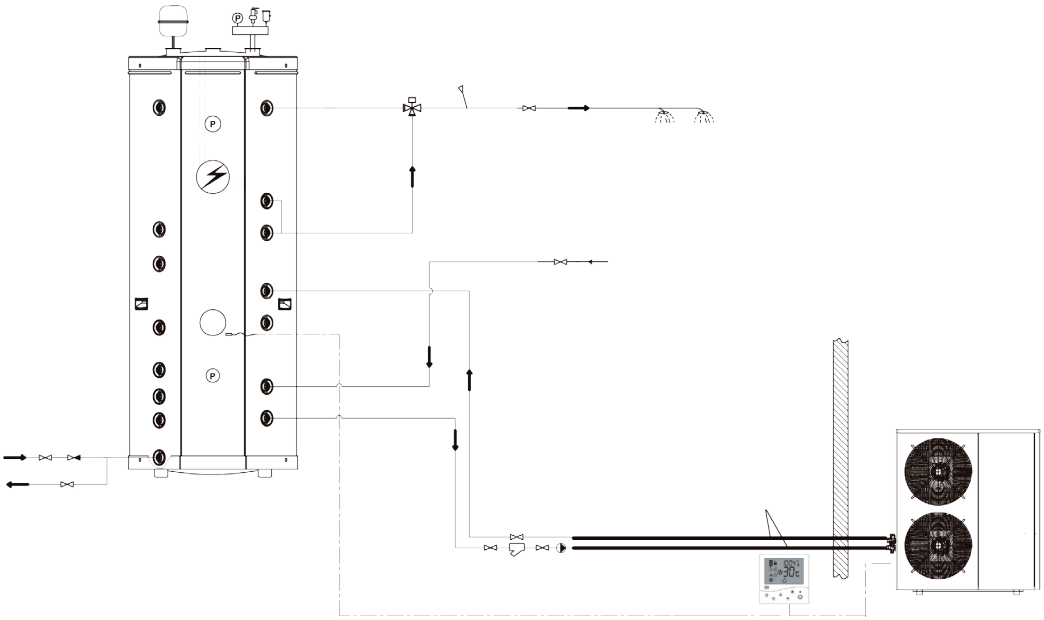
2. Installation

2.4 Installation types

3. New installation

If it is a new build, installation of the heat pump also affects your new system for hot water, we would like to take the opportunity here to inform you about the Swedish concept of ”Safe Water Installation”. This is an installation that is executed according to applicable industry rules, by authorized fitters and supervisors employed by an authorized HVAC company and where prescribed checks are performed and a certificate given to the client. These industry rules were introduced in September 2005 and are produced by the Swedish HVAC sector in consultation with suppliers, insurance companies and authorities.

In cases where you do not have existing equipment and do not wish to have your own boiler, we recommend that you connect your new Invest Living Bonus Air 10 to a combination tank (also called a multifunctional tank) with inbuilt immersion heater. The connection principle is the same here as with the two alternative installation types, described previously for existing installations – with the difference that a boiler with water heating is replaced here by the combination tank.



See appendix 5.5 page 31 for legend
Also available for download at www.investliving.se

2. Installation

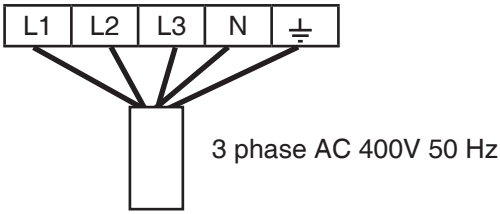
2.5 Opening service hatch (front panel)

To remove the front panel all you need to do is undo 4 screws, 2 at the top and 2 at the bottom of the plate. Unscrew them and then remove the plate outwards and downwards.
To access the circuit board and terminal blocks, undo 4 screws that hold the electronics box's protective plate in place.

2.6 Connecting electricity

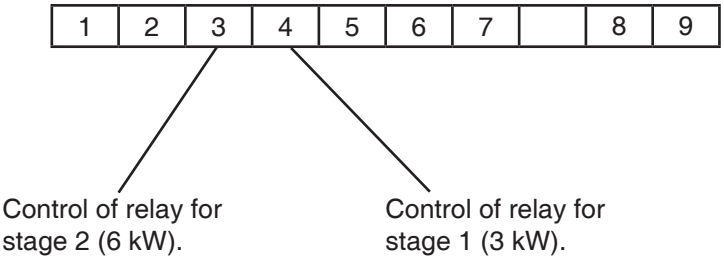
- The power cable must be connected to a safety switch.
- Cable of 5 wire type, 2.5 mm^2
- Electric cable is factory fitted, if you need a longer cable, connect it as in the diagram.

Terminal block Bonus Air 10



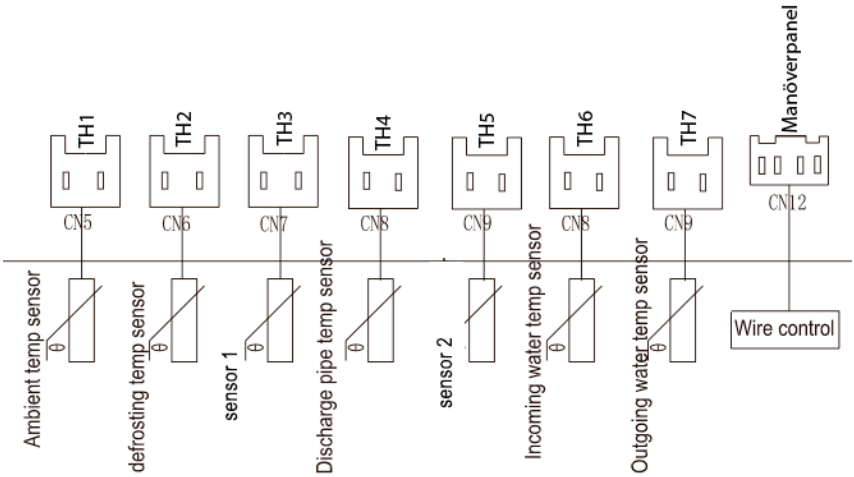
2.7 Connection of external immersion heater

In many types of installation connection of an external immersion heater is both necessary and beneficial. The immersion heater can be integrated in a water tank or simply provide peak heat in the heat circuit after the heat pump. Invest Living Bonus Air 10 has an inbuilt automatic system for control of an external immersion heater. Below are instructions on how to connect the immersion heater in the heat pump.



2. Installation

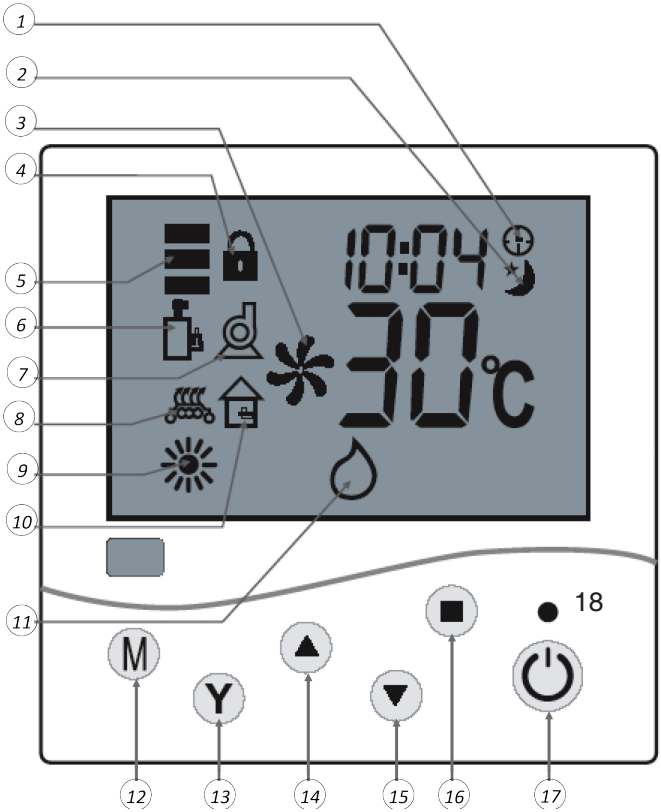
2.8 Connecting sensors



The terminal diagram shows where the different temperature sensors are connected on the heat pump's control card. They are all connected on delivery.
Sensor 1 (room/tank) and Sensor 2 (room freezing protection) are positioned on the outside of the heat pump ready for installation.

3. Use

3.1 The control panel



1. The timer function is on	10. *Temp. sensor 2 “ frost protection”
2. Timer function is off	11. Temp. sensor 1 ”room/tank”
3. Shows that the installation is in operation	12. Control knob
4. Locked position (this function is inactivated)	13. Change between sensor 1 or 2
5. The immersion heater’s power stages	14. Increase the value
6. The compressor is running	15. Reduce value
7. The circulation pump is running	16. Function button
8. The immersion heater is in manual mode	17. OFF/ON button
9. Heating in operation	18. Diode, lit when operating mode is ON
INFO: Each control/function button has several functions. * ”Sensor 2”, Shows temperature in the room where it is located. If the temperature is below the set value ”x”, production of heat increases to avoid too low a temperature in the room. The sensor is preset at 8°C, changed in F-parameter F-12.	

3. Use

3.2 The button's functions

M Before the unit is put into operation, hold this button pressed in for 5 seconds to access the user settings. Hold the button pressed in for 10 seconds to access parameter settings.
After the machine has started.
Hold the button pressed in for 5 seconds to select manual or automatic heating.

Y Press this button to change between information or setting for temperature. When the symbol is displayed, the temperature can be read off where the "sensor 2" is located. To change settings of operating temperature, must be displayed.

▲ Increase value.

▼ Reduce value.

Button to check settings. Hold the button in for 5 seconds for Manual defrosting.

OFF / ON button



If the unit is installed when the temperature is BELOW **0°C**. the compressor/unit **MUST** be connected to a power supply for **AT LEAST** 2 hours before being started.
This is to ensure that the compressor is not frozen.

3. Use

3.3 User settings

Location of temp. sensor *(sensor 1)*

Locate the sensor in the tank so that heat pump operation is controlled by the tank temperature. If instead you want the room temperature to govern heat pump operation, position the ”sensor 1” in the rooms that you want to govern the temp.

When you have done this, you can implement settings for the temperature sensor (sensor 1), these are implemented when the machine starts, see section 3.5 on page 22.

The heat pump has many possible settings, some of these must be made BEFORE the machine is started, others can be made while the machine is in operation. Before you start the machine, we recommend that you set the display’s brightness and clock. The machine has a number of presettings to ensure a simple start and safe operation. If, however, you wish to change these so-called parameter settings (see next page), this should also be done PRIOR TO the machine being started.

The following settings can only be made when the machine is off.
(i.e. when the red light on the control panel is not lit)

Setting brightness and clock

Hold the M button pressed in for 5 seconds. The following can then be adjusted:
1. Brightness in the display.
2. The clock.
3. The timer function so that the installation runs during the set period.

Change mode by pressing the M button. Use ▲ ▼ to increase and reduce value.
Confirm the settings by pressing the ⏻ button or waiting for 1 minute.

Parameter settings ”F” *(should be performed by a professional)*

Press M for 10 seconds to access parameter settings ” F-01 is displayed.
“For parameters, see next page”.
Press M to change to next parameter.
Use ▲ ▼ to raise or lower value.
Press ⏻ when all parameters are set in order to start the pump.

3. Use / 3.4 F-Parameters

Code	Contents	Factory setting	Range
F-01	Correction of sensor value for the outside temperature.	0 °C	- 9 °C ~ 9 °C
F-02	Correction of sensor value for the defrosting temperature.	0 °C	- 9 °C ~ 9 °C
F-03	Correction of sensor value for sensor 1. If you have a heat pump you may need to adjust this value upwards somewhat (+2 to +5) Reason: To avoid too high pressure in the compressor.	0 °C	- 9 °C ~ 9 °C
F-04	Correction of sensor value for the compressor temperature.	0 °C	- 9 °C ~ 9 °C
F-05	Correction of sensor value for the sensor 2.	0 °C	- 9 °C ~ 9 °C
F-06	Water in temperature.	0 °C	- 9 °C ~ 9 °C
F-07	Water out temperature.	0 °C	- 9 °C ~ 9 °C
F-08	Adjustment of the hysteresis for tank temperature. Standard setting 5 °C, i.e. difference between reduction and increase in the energy source.	5 °C	1 °C ~ 5 °C
F-09	Adjustment of the hysteresis for the room temperature.	1 °C	1 °C ~ 5 °C
F-10	Not used	-	-
F-11	Lowest outside temperature for operation of heat pump. * see page 22	- 19 °C	-19 °C ~ 15 °C
F-12	Frost protection room sensor ”sensor 2”	8 °C	0 °C ~ 20 °C
F-13	Highest permissible compressor temperature. (*For temperatures over 99 degrees only a letter + the final digit are displayed. The relevant temperature is represented by the final digit + the letter. A = 100 , B = 110, C= 120. For example, B9 means 110 +9 = 119.)*	110 °C	95 °C ~ 125 °C
F-14	Lowest outside temperature to start operation of the heat cable.	4 °C	0 °C ~ 8 °C
F-15	Lowest water temperature in the tank to start the heat pump or the immersion heater to avoid freezing. Only applies if the indoor temperature is below this value for a prolonged period, the water in the tank cools down.	2 °C	0 °C ~ 8 °C
F-16	The difference between outside temperature and the temperature in the evaporator.	3 °C	3 °C ~ 20 °C
F-17	Lowest evaporator temperature to start the defrosting cycle.	- 2 °C	- 19 °C ~ 0 °C
F-18	Highest evaporator temperature to finish the defrosting cycle.	20 °C	1 °C ~ 20 °C
F-19	Minimum time interval between the defrosting cycles. The program control sometimes uses double time. **NB.** The value may need to be adjusted down in connection with high humidity.	35 minutes	30 ~ 99 min
F-20	Longest period for defrosting, (manual defrosting see page 23).	12 minutes	3 ~ 25 min
F-21	Time interval between control of the temperatures in the heat exchanger, the heat cable, and the compressor. **Reason:** Avoid frost damage at too low outside temperature.	10 min	3 ~ 60 min
F-22	Buzzer signal in connection with alarm. Standard no signal.	0	0=Off, 1=On
F-23	In the event of power failure, the installation starts automatically after the power has been restored. This takes place after 5 minutes.	1	0=Off, 1=On
F-24	Adjustment of the clock's running time, the clock follows the current time without displacement. (see page 25 on the clock's battery).	0	- 19 ~ 19 sec
F-25	Cycle to decontaminate legionnaire's disease, i.e. the tank water is heated to 63 degrees in this process in order to decontaminate any legionnaires bacteria. (only applies when external immersion heater in tap water tank is used)	0	0=Off ~ 1-99 day
F-26	Not used.	-	-

3. Use

3.4 F-Parameters

*Your heat pump operates down to -25º C and has been successfully tested even at yet colder weather. At these temperatures, however, limits the efficiency of the natural laws a heat pump and the heat pump then works in a relationship more and more like an ordinary electric radiator, ie that it provides as much heat output as power input into. To protect your heat pump, is recommended stoppages at -19º C, this is also the machine's default setting. The default setting can be changed to a stoppage at another outdoor temperature. If you wish despite our recommendations, let the the heat pump run even in colder weather than -19º C, see page 34th

3.5 Settings

The following settings can, if necessary, only be made when the machine starts.

Temperature settings

Press on Y so that only the symbol is shown in the display, the symbol should not be shown.

- If you are running with TANK, you set the temperature with ▲ ▼ to the temperature you want the pump to work at, recommended **MAX 55°C**.
- If you are running with ROOM, you set the temperature at. **MAX 30°C**.

Reading the temperature sensor's current values

By briefly holding the button pressed in, L-functions can be accessed. To change to the next value press the button again.
To return to normal mode, press the button.

For temperatures above 99 degrees, only a letter + the final digit are displayed. The relevant temperature is represented by the final digit + the letter. A = 100 , B = 110, C = 120. For example B9 means 110 + 9 = 119.

Code	Meaning
L-01	Outside temperature. TH1
L-02	The evaporator's temperature. TH2
L-03	Temp. sensor 1 (room/tank). TH3
L-04	The compressor's temperature. TH4
L-05	Temp. sensor 2. (freeze protecktion) TH5
L-06	Water in. TH6
L-07	Water out. TH7
L-08	Technical settings for the circuit board.
L-09	Technical settings for the circuit board.

3. Use

3.5 Settings

Manual defrosting

If the button is held pressed in for 5 seconds, manual defrosting starts.
The symbol flashes during the defrosting cycle.

This only happens if the automatic defrosting is not working satisfactorily. The problem might be a sensor that is not working, or that the defrosting setting in the program has to be changed.

Immersion heater *(applies in those cases where an external immersion heater is installed)*

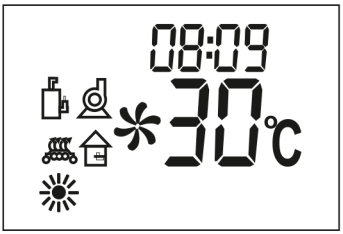
For immersion heater with 3 power stages.

These settings are made after the heat pump has been started.

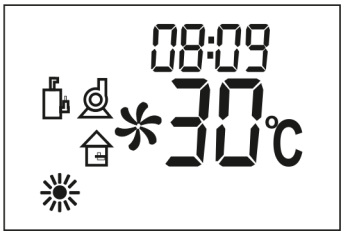
Press on M for 3 seconds to change between manual and automatic immersion heater operation. Factory setting is when the immersion heater is connected automatically.
When manual control is selected, 2 buzzer signals are heard and the symbol is displayed.
When automatic control is selected, 1 buzzer signals is heard and the symbol disappears.

When operating mode is selected (manual electric automatic), you select the capacity of the immersion heater by pressing M to select 3, 6 or 9 kW. This is indicated by 3 horizontal bars in the top left corner of the display.

Appendix 5.7 on page 33 has illustrations of the power modes that are shown in the display.



Manual control



Automatic control

4. Maintenance / Troubleshooting

4.1 Error codes in the display

Fault code	Description	Check the following / Solution
Er00	Communication problem.	1. Check the control panel's connections on the circuit board. 2. Check the cable between circuit board and control panel.
Er01	Sensor fault for outside temperature.	Change sensor.
Er02	Sensor fault for defrosting.	Change sensor.
Er03	Sensor fault, sensor 1.	Change sensor.
Er04	Sensor fault, hot gas sensor.	Change sensor.
Er05	Sensor fault, sensor 2.	Change sensor.
Er06	Sensor fault, water in.	Change sensor.
Er07	Sensor fault, water out.	Change sensor.
Er08	Phase fault.	1. Electricity connection to the compressor is faulty. Invert phases. 2. Check the voltage between the phases.
Er09	Fault in refrigerant circuit.	Check leakage in the circuit. Refill gas (R410A) if necessary. See technical specification on page 8 for weight.
Er10	Lack of water or flow in the system.	1. Check that there is no air in the system. Bleed if necessary. 2. Lack of water in the system. Ensure that the tank is filled. 3. Check that the filter is not clogged. Clean filter. 4. Check circulation pumps in the system. 5. Check the flow indicator. Change if necessary.
Er11	Problems with the flow in the external system.	The signal triggers the error code ER 11 shows the flow of water in the external water e.g. tank is too low. Check linking the terminals 8 and 9 is therefore not active. Important that the jumper is in place.
Er12	High pressure alarm.	This occurs when the compressor's temperature or pressure exceeds the limit value. Check the water temperature in the pipe system to the heat the pump as well as from the heat pump. If the difference exceeds 12 degrees the flow is too low. Take action in accordance with Er10.
Er13	Low pressure alarm.	1. Check that there is no snow and ice in the heat pump and that the fans are running satisfactorily. Clean. 2. There might be a lack of refrigerant. Check the amount of gas. Refill gas (R410A) if necessary. See technical specification on page 8 for weight.

NB.
If there is a fault, the heat pump makes three attempts to start before turning off and displaying a fault code.

4. Maintenance / Troubleshooting

4.2 Maintenance

1. Making changes in the structure of the unit is not permitted. It can cause personal injury or damage to the unit.
2. If the unit is not functioning properly, turn off the power. All maintenance work shall be performed by qualified personnel.
3. There is a small troubleshooting list in the manual which you can go through to try to find any faults that might occur.
4. The heat exchanger can get dirty over time, which can affect the unit's perfor mance.
   You should therefore also clean the heat exchanger from time to time.
5. Check and clean the water filter in the system.
6. The heat pump's control panel contains a standard CR1220 battery which powers the clock. The clock is very important for the heat pump operation. The battery should be changed at 2.5 – 3 year intervals. Neglecting to do this may lead to a flat battery, resulting in disruption to the heat pump's defrosting function and other effects which can damage your heat pump.

Evaporator



1. Always turn off the power before you clean the unit.
2. The inside of the unit must be cleaned by a qualified person.
3. Do not use petrol, benzene, strong detergent etc. to clean the unit.
   We recommend that you use detergent of the soft soap or dishwashing detergent type.
4. Spray the detergent on the evaporator and leave it for approx. 5-8 minutes.
5. Then spray clean water on the evaporator.
6. An old hair brush functions very well to remove any dirt or fluff from the fins. Brush in the same direction as the openings between the fins, so that the brush can go between them.
7. After cleaning, use a soft and dry cloth to dry the unit. The fins do not need to be wiped as they are blown clean by the fan.

Refilling of refrigerant

If there is insufficient refrigerant in the system the machine can freeze or stop providing heat. There may be a leak in the system. New refrigerant must not be refilled before the fault is rectified.

1. Only a qualified person may refill refrigerant.
2. To check whether there is sufficient refrigerant in the system, check the pressure in the system.

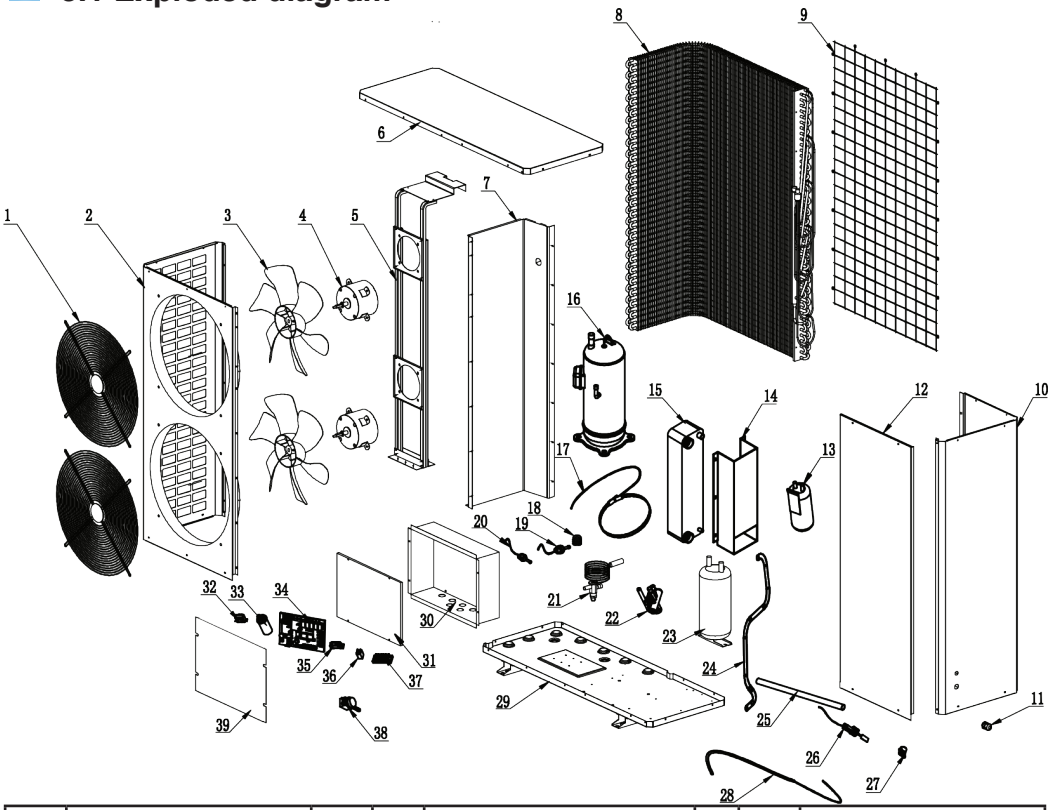
4. Maintenance / Troubleshooting

4.3 Troubleshooting

Problem	Reason	Solution
The heat pump doesn't start.	1. The unit's power cable might have come loose.	Check the cable connections.
	2. A fuse may have blown.	Check that the unit is properly earthed. If the unit is properly earthed, check the fuse and change if necessary.
	3. The protection mechanism is on.	A fault has occurred in the system. Check the fault code list and try to resolve the problem before you start the unit.
	4. Fault in the compressor.	Change compressor.
The fan is not working.	1. The cable to the fan motor is not properly connected.	Check the cable connections.
	2. The fan motor is burnt.	Change fan motor.
Low heat output.	1. The heat exchanger is clogged.	Clean the heat exchanger.
	2. Blocked air intake or outlet.	Remove the blockage.
	3. Lack of refrigerant.	Test the unit and inspect it for leakage. If you find a leak it must be rectified immediately. The remaining refrigerant must be evacuated. After evacuation, refill specified amount of new refrigerant.
The heat pump makes too much noise, no water flow when the pump is in operation.	1. There is insufficient water.	Check the water refill system. Refill if necessary.
	2. Air in the water system.	Bleed the system.
	3. The water valve is closed.	Check that all valves are fully open.
	4. The filter is blocked.	Clean the filter.
Too high pressure on the high pressure side (too high pressure in the refrigerant circuit).	1. Too much refrigerant.	Drain off refrigerant. After emptying, refill specified amount of new refrigerant.
	2. Air in the refrigerant system.	Drain off refrigerant. After emptying, refill specified amount of new refrigerant.
	3. Insufficient water flow.	Check the water flow in the system. Use a larger pump if necessary.
	4. Too high water temperature.	Check value on the water temperature sensor, ensure it is functioning properly.
Too low pressure on the low pressure side.	1. The drying filter is blocked.	Replace.
	2. Fault in the expansion valve.	Check and replace if necessary.
	3. Lack of refrigerant.	Test the unit and inspect for leakage. If you find a leak it must be rectified immediately. The remaining refrigerant must be evacuated. After evacuation, refill specified amount of new refrigerant.
The unit does not defrost normally.	1. Faulty temperature sensor for heat exchanger.	Check the position and value of the temperature sensor. Replace if necessary.
	2. Blocked air intake or air outlet.	Remove the blockage. Clean the evaporator.
	3. The clock in the display is not functioning.	Change battery.

Appendix

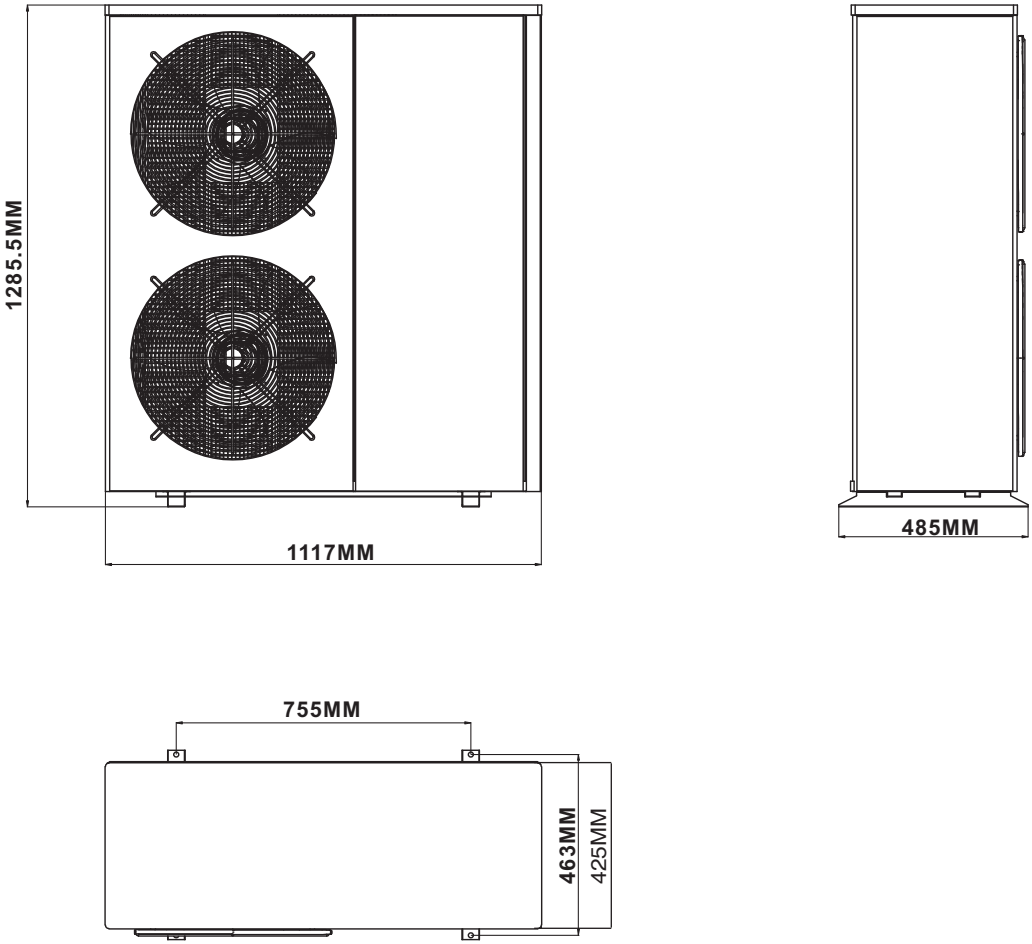
5.1 Exploded diagram



1	Fan grill		14	Holder for plate heat exchanger		27	Connection
2	Left panel		15	Plate heat exchanger		28	Heat cable
3	Fan blade		16	Compressor		29	Bottom plate
4	Fan motor		17	Heat cable compressor		30	Electronics box
5	Fan motor bracket		18	Rubber feet for compressor		31	Protection plate for electronics
6	Top plate		19	High-pressure monitor		32	Transformer
7	Inner panel		20	Low-pressure monitor		33	Fan motor condenser
8	Evaporator		21	Expansion valve		34	Circuit board PCB
9	Evaporator protection		22	Four-way valve		35	Relay socket
10	Right panel		23	Separator		36	Relay
11	Copper nut		24	Copper pipe		37	Terminal block
12	Front panel (service hatch)		25	Copper pipe water		38	Thermostat
13	Refrigerant accumulator		26	Flow indicator		39	Cover for electronics box

Appendix

5.2 Dimensions



Appendix

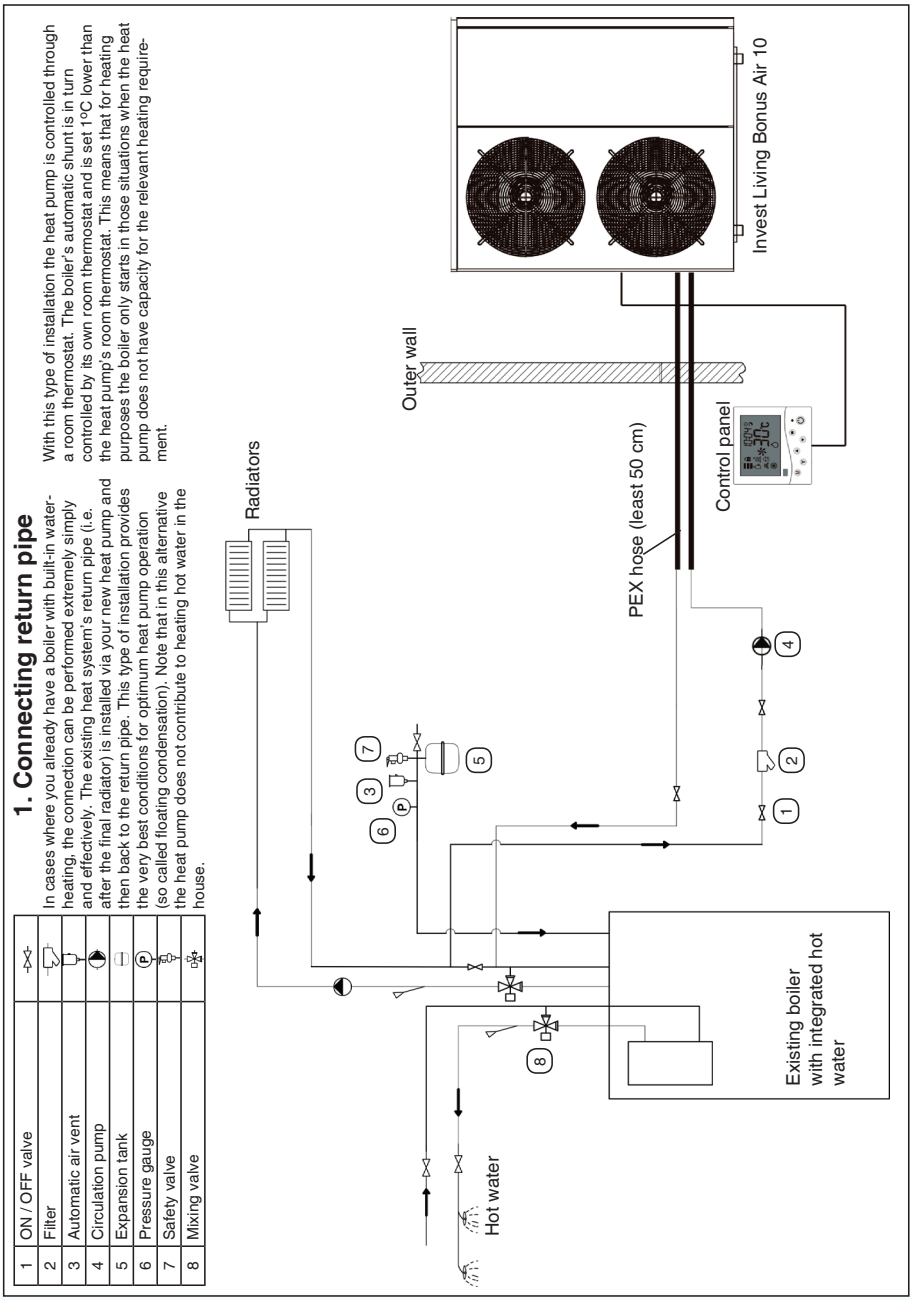
5.3 Connecting return pipe

1. Connecting return pipe

In cases where you already have a boiler with built-in water-heating, the connection can be performed extremely simply and effectively. The existing heat system's return pipe (i.e. after the final radiator) is installed via your new heat pump and then back to the return pipe. This type of installation provides the very best conditions for optimum heat pump operation (so called floating condensation). Note that in this alternative the heat pump does not contribute to heating hot water in the house.

With this type of installation the heat pump is controlled through a room thermostat. The boiler's automatic shunt is in turn controlled by its own room thermostat and is set 1°C lower than the heat pump's room thermostat. This means that for heating purposes the boiler only starts in those situations when the heat pump does not have capacity for the relevant heating requirement.

1	ON / OFF valve	
2	Filter	
3	Automatic air vent	
4	Circulation pump	
5	Expansion tank	
6	Pressure gauge	P
7	Safety valve	
8	Mixing valve	



Appendix

5.4 To existing boiler

1	ON / OFF valve	
2	Filter	
3	Automatic air vent	
4	Circulation pump	
5	Expansion tank	
6	Pressure gauge	
7	Safety valve	
8	Mixing valve	
9	Sensor	

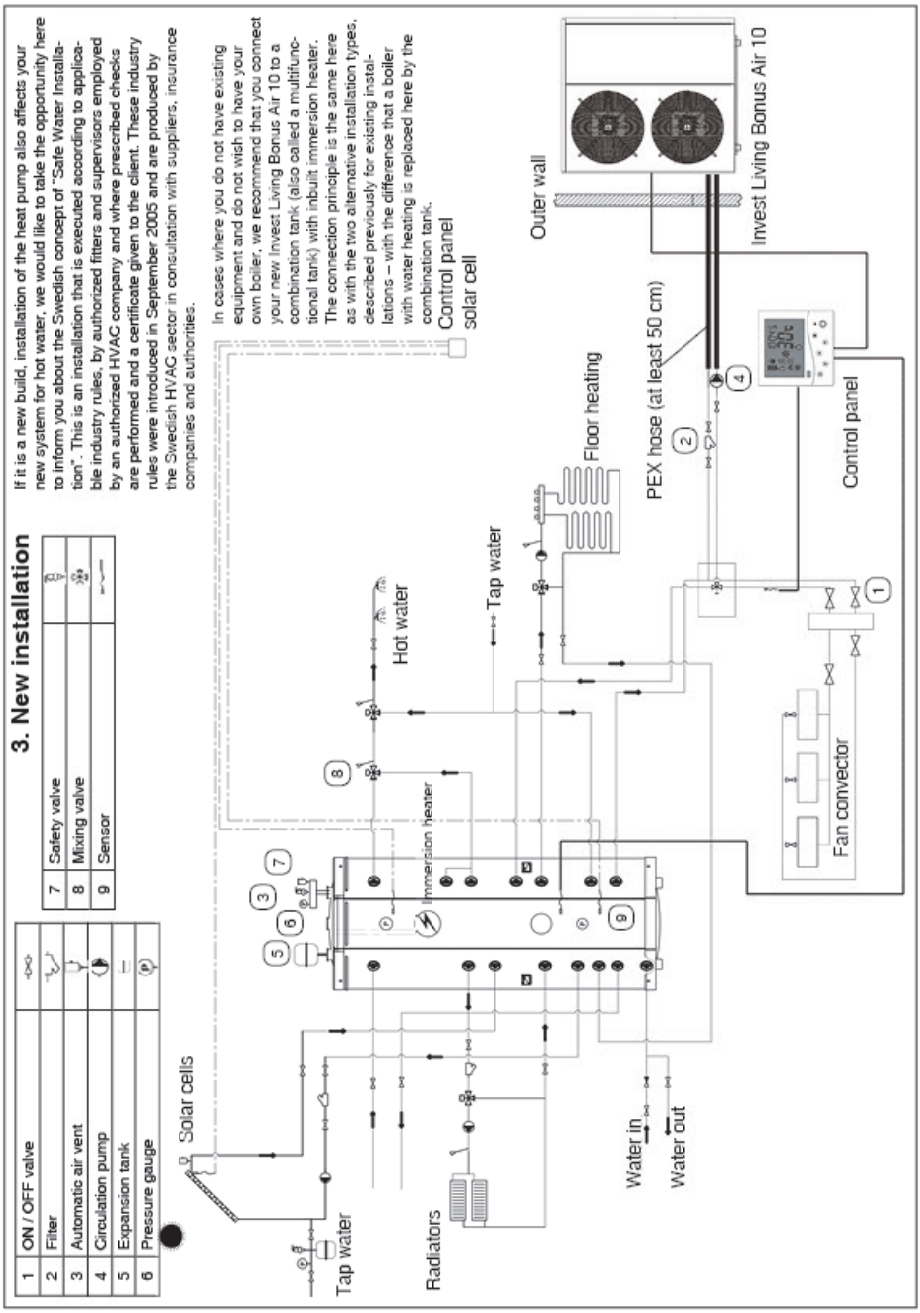
2. Direct connection to boiler

In cases where you wish to run your existing boiler concurrently with water heating and your new heat pump, we recommend that you connect the heat pump directly to the boiler. Heated water from the heat pump is conveyed into the boiler's top section, the heat is emitted to the boiler and subsequently conveyed from the colder bottom of the boiler back to the heat pump. The heat pump provides an effective contribution (through so-called "firm condensation") for both heating and hot water. Water heating has to be supplemented with an external water heater for "peak" hot water temperature.

Note that if you have an existing manual shunt valve on your boiler, you need to supplement this with a temperature limiter, or alternatively replace this with an automatic motor shunt in order to avoid too high water temperatures in the heat pump. With this type of installation, the heat pump is controlled through a temperature sensor located in the boiler. The heat pump then moves towards a given preset temperature that is selected based on the operating conditions.

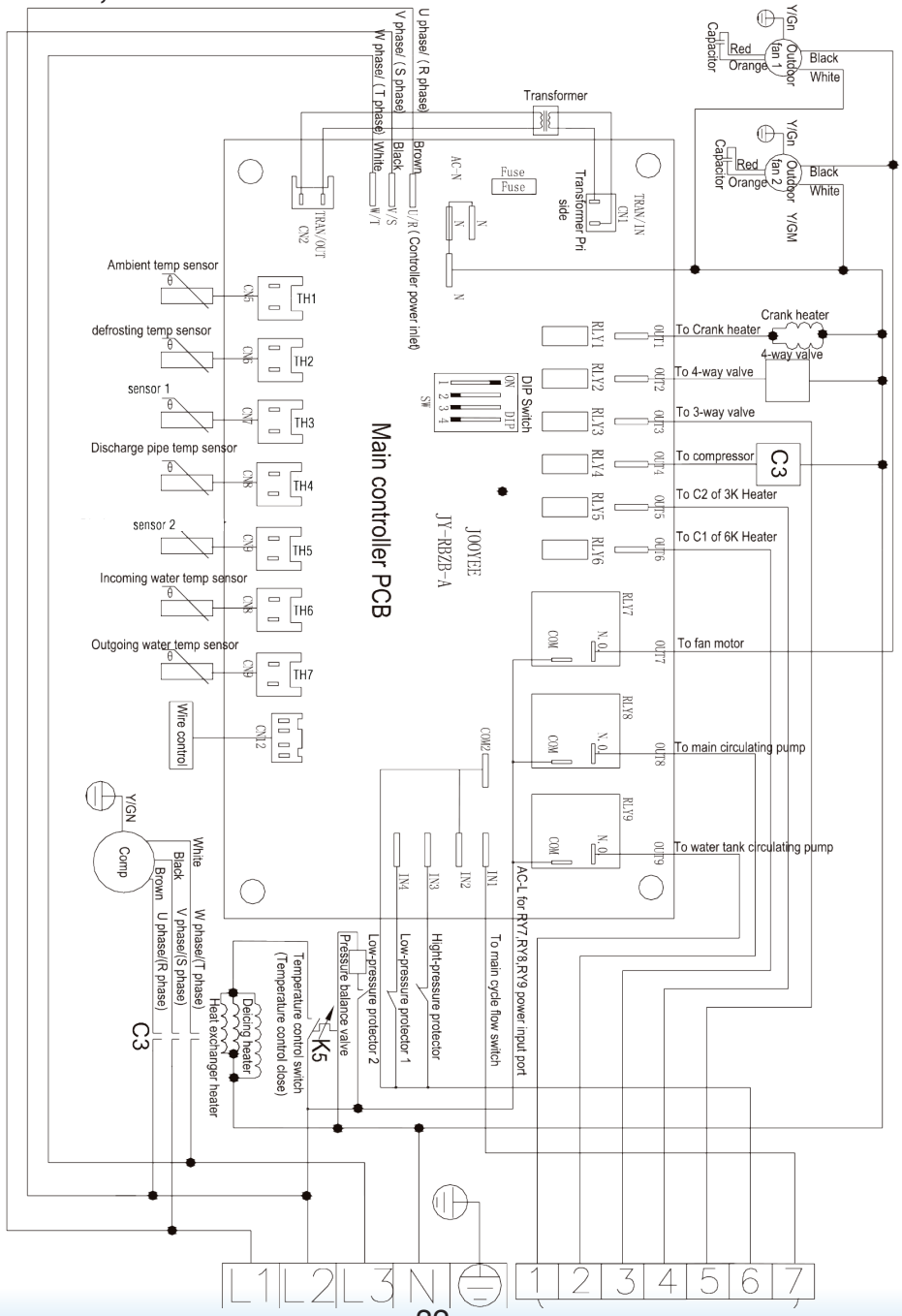
Appendix

5.5 New installation



Appendix

5.6 PCB, circuit board

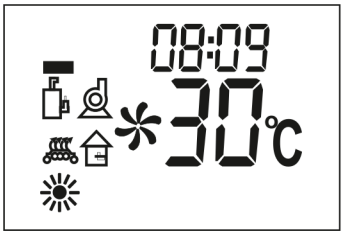


Appendix

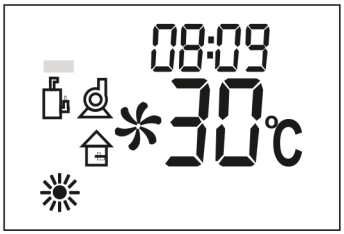
5.7 Immersion heater, power mode

In many types of installation connection of an external immersion heater is both necessary and beneficial. The immersion heater can be integrated in a water tank or simply provide peak heat in the heat circuit after the heat pump. Invest Living Bonus Air 10 has an inbuilt automatic system for control of an external immersion heater. There is an illustration below of how power to the immersion heater is controlled in the control panel:

If 3 kW mode is selected, the following is shown in the display (1 bar).

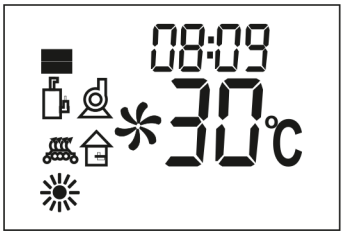


Manual control

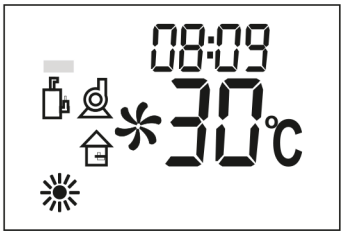


Automatic control

If 6 kW mode is selected, the following is shown in the display (2 bar). The immersion heater starts from 3 kW for 1 hour and then changes to 6 kW.

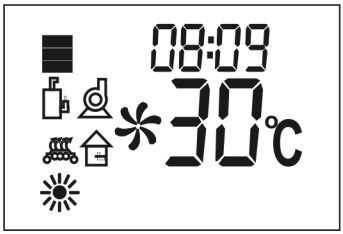


Manual control

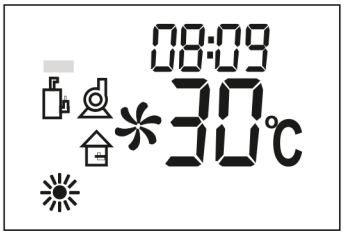


Automatic control

If 9 kW mode is selected, the following is shown in the display (3 Bar). The immersion heater starts from 3 kW for 1 hour and then changes to 6 kW for 1 hour and after a total of 2 hours changes to 9 kW mode.



Manual control



Automatic control

Appendix

5.8 Setting for operation at a lower temperature

If you wish despite our recommendations and let the pump run even in colder weather than -19° C, can this be achieved by ”tricking sensors L-01 and L-02” to believe it is warmer outside than it really is. This is done by parameter settings, both parameters F1 and F2.
NOTE: These changes of parameters should be made with caution and **MUST** be restored when it again becomes warmer outside.

Do you want the heat pump to go down to -25° C, for example, set the parameter F1 to +6 and F2 similarly to +6. Note that if you change only F1, it can begin to alarm for fault Er 9, the refrigerant shortage, which is unfortunate.

It is very important to return to normal levels when it gets warmer out, problems otherwise occur when, for example the temperatures go to 0° C degrees and the display shows L1 = +6 and L2 = +3. Here it then becomes a problem with the defrost. It will be ice on the evaporator and L2 is in fact -3 but shows +3. The defrost cycle do not go in at all because it is + degrees. For this to function satisfactorily we must therefore change the parameters F1 and F2 when it gets warmer outside to avoid getting defrost problem around 0° C degrees.

5.9 Changes in the manual from the previous version

Version 201604ENG
- Sensors from previous manufacturing series called differently.
  Tank sensor units nowadays sensor 1
  Room sensor units nowadays sensor 2
- Default Settings F parameters are changed.
  F-12 15 to 8 (pump began as early once it was 15° C degrees in the boiler room, etc.).
  F-17 from -5 to -2 (icing around 0° C degree temperature prompting defrosting miss sometimes).
  F-18 from 8 to 20 (increased steam temperature at the defrost).
  F-19 45-35 (decreased time to control the defrost).
  F-20 from 8 to 12 (increasing the time of defrost cycle).
- Changed the Annex 5.6 and the picture on page 17, the names of the sensor 1 and sensor 2
- New text page 17 about plastic mesh and steel mesh.
- New text page 34 on how to set the operating temperatures below -19° C degrees.
- Page 24, change of action at the ER11 error.
- Various typos.

Appendix

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Ver. 201604ENG