

MANUAL AQUAPAQ



AQUAPAQ

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Introduction

This manual is written for mecaterm's compact ground source/geothermal heat pumps AquaPaQ 5, 8, 10 and 12.

The manual contains chapters that are intended for both end users and installers. The chapter "Handling" is directly specifically at users of the system.

The heat pump

Congratulations!

You are now the owner of a top-quality product that will reduce your electricity bills and save you money that can be spent on much more enjoyable things.

The heat pump is manufactured by mecaterm in Malmö, Sweden, who have extensive experience in manufacturing heat pumps. All heat pumps, before leaving the factory, have first been tested for functionality and technical performance. All stages of manufacturing, from the plated chassis to the finished heat pump, are monitored to continually maintain quality.

The chassis of the heat pump, including all screws and rivets, are manufactured from stainless steel, which requires minimum maintenance and offers a long-lasting, durable structure. The components used in the heat pump are from renowned suppliers and are chosen on the basis of functionality and quality, which means that a minimum of servicing is required.

AquaPaQ

The AquaPaQ unit is a so-called compact liquid/water heat pump, which means that energy is extracted from a collection pipe in the bedrock, in surface soil, in lakes, etc. The unit also has a tank section which ensures that you always have heating for your house, as well as hot water. AquaPaQ is equipped with a low-energy, speed-controlled circulation pump, and with our special changing valve solution, the electric heater only needs to be used in exceptional cases.

Delivery & Safety

Important!



Check the following points during delivery and installation:

- Remove packaging and check that the product has not been damaged in transit. Report any transit damage to the freight agent.
- Make sure that at least one metre of space is available in front of the product for service access.
- The heat pump module can be easily uninstalled and carried separately by disconnecting the heating hoses to the tank, the communication cables and the power cord.
- Make sure that the bag accompanying the unit includes the following accessories for the product:
 - Manual
 - Outdoor sensor & room sensor
 - 3 current transformers

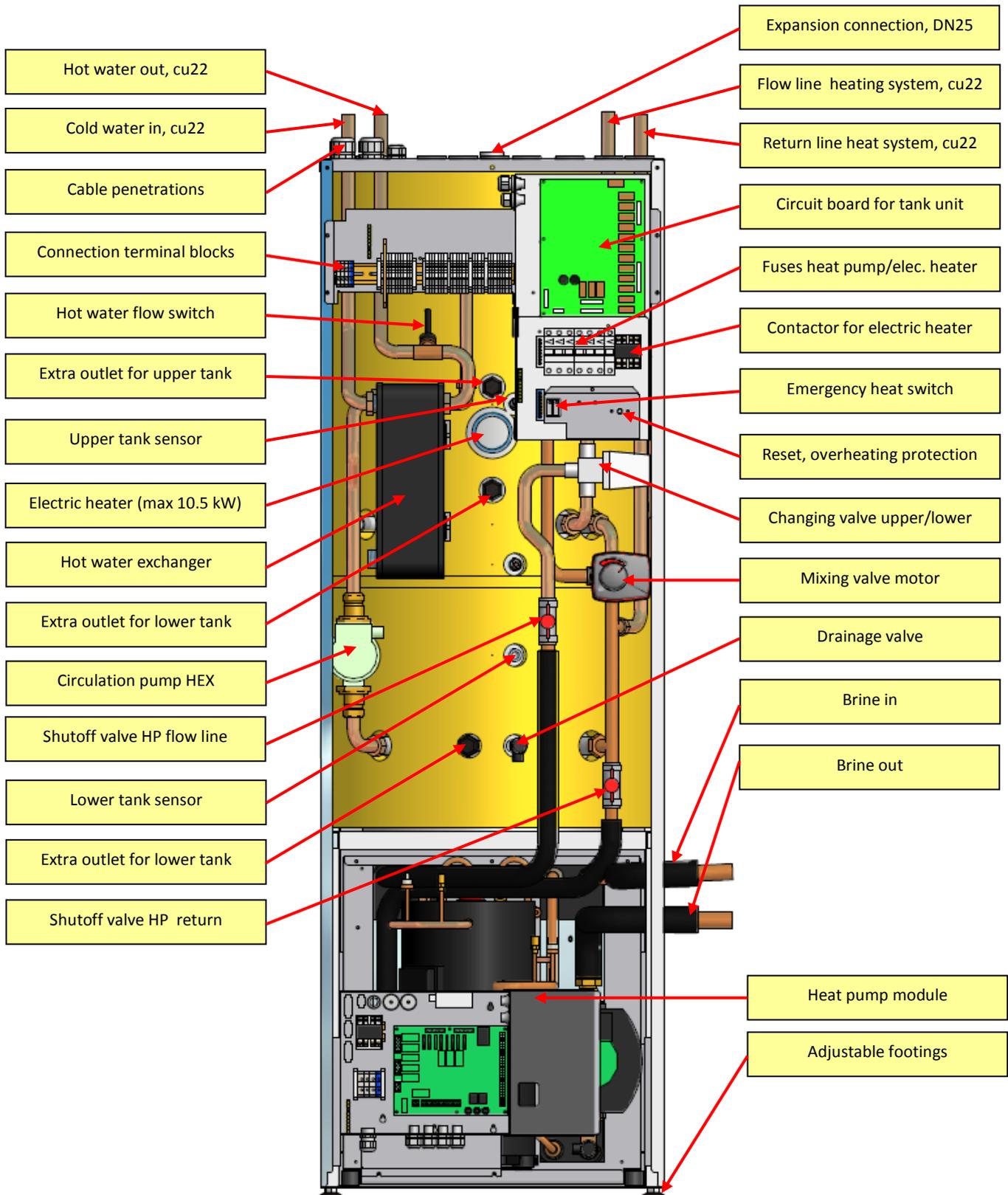
Safety regulations



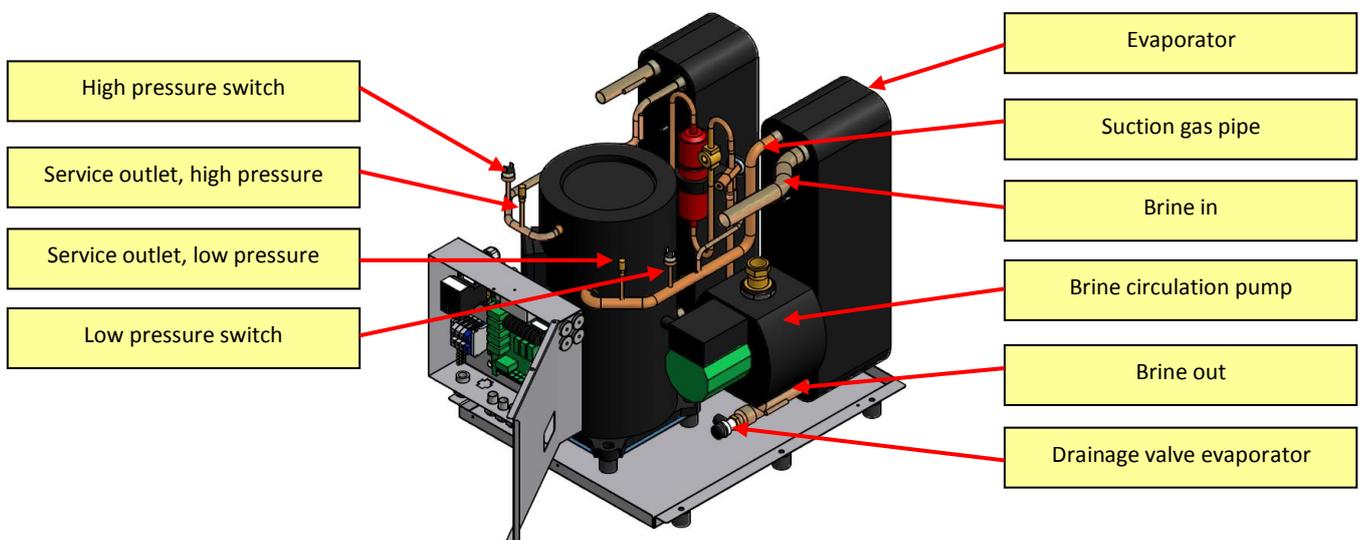
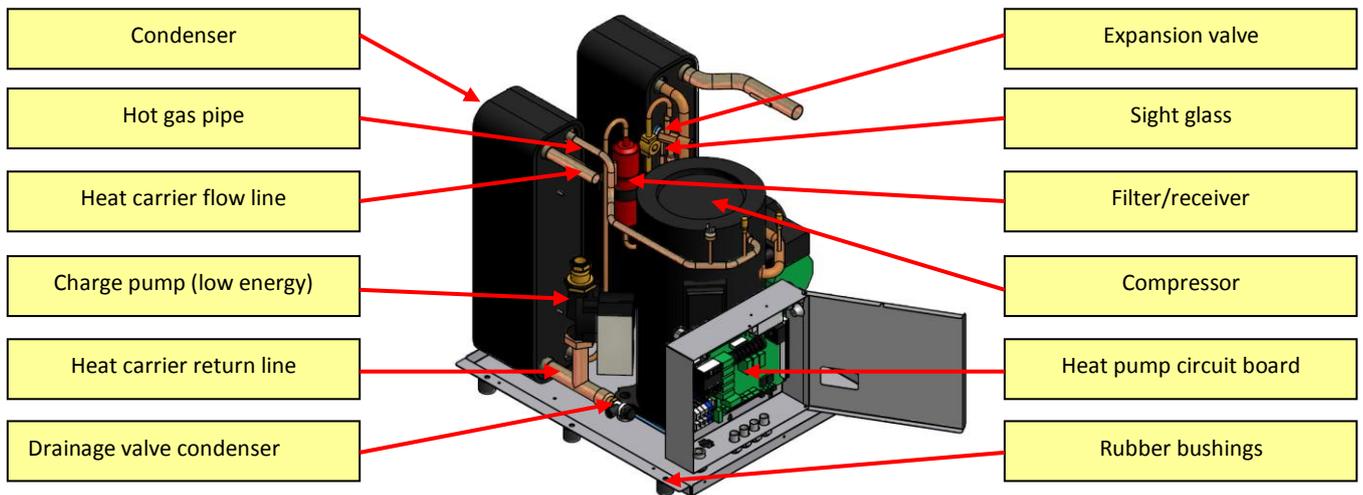
The following safety regulations must be observed when handling, installing and using the product:

- An omnipolar switch should be installed on the power supply cables prior to the product
- Disconnect the power supply in the control box prior to carrying out any kind of maintenance or service work on the products.
- Make sure that all lifting equipment, eye bolts and other components are undamaged when handling heat pumps fitted with eye bolts or similar items. Never stand under a product when it is in an elevated position.
- Never compromise on safety by removing housings, hoods or similar items which are screwed in place.
- Never compromise on safety by disconnecting safety equipment.
- Only authorised personnel are allowed to modify or service the product.

Overview of tank section



Overview of heat pump module



Handling

This chapter is intended for you, the end user of the product, and describes how your new heating system functions and your options for adjusting the settings in order to make your house as comfortable as possible with the best cost-efficiency.

Ask your installer to go through the system with you, and ask for the registration form to fill in after the installation is completed.

How the AquaPaQ works

The AquaPaQ consists of 2 parts: a tank component and a heat pump component. The tank holds the water which is used to heat your house and to supply hot water for showering, etc. Since the water to heat your house (radiators/underfloor heating) does not need to be equally hot all the time, the tank is divided into two sections, a lower section and an upper section. There is a plate between these two sections, which ensures that the tank can maintain two different temperatures.

Lower tank section

The lower tank section is used primarily to heat the house, but also to preheat the cold water that will become hot water in the AquaPaQ. Depending on your heating system, different water temperatures are necessary at different outdoor temperatures. If it is warm outside, the system does not need very hot water. Conversely, if it is very cold outside, higher temperatures are needed to heat the inside of the house. The temperature of the water that is sent to your radiators / underfloor heating is determined by the so-called heating curve. You can set this curve yourself. It is important to make sure that the heating curve is set properly - for your own comfort, but also to ensure the overall efficiency of the heating system.

Upper tank section

The upper part of the tank is used primarily to heat your hot water. Because you always want to have hot water available, the heat pump keeps this section warm regardless of the outdoor temperature. You can set the temperature in this part of tank yourself. The higher the temperature, the warmer the hot water, but hotter water needs more energy and is therefore more expensive.

Hot water

AquaPaQ uses a special technique for heating the hot water through a special exchanger. When you start to lose hot water, e.g. during showering, water is drawn from both the lower and the upper tank sections through the exchanger, where the cold water comes in and is heated into hot water. There is no risk of legionnaires' disease because the hot water is not stored, rather it is produced directly as needed.

The heat pump

The heat pump is at the bottom of the AquaPaQ and is connected to both the upper and lower tank sections. This means that the heat pump heats either the upper tank section or the lower tank section, depending on requirements. The heat pump is also connected to the so-called brine system. The brine system is the system where energy is collected to heat the water in the tank using the heat pump. Energy can be drawn from either a borehole, the ground or a lake.

Electric heater

AquaPaQ has an integrated electric heater in the upper section of the tank. This is used if the energy from the heat pump is not sufficient or if there is a fault in the heat pump.

Heating curve

This chapter describes how the heating for the house works and how you can adjust the so-called heating curve to achieve maximum savings without sacrificing comfort.

Heating requirements for the house

How your house is built, the climate in your area, and what type of heating system you have all influence how much energy is needed to heat it.

There are many factors that affect the temperature required for your heating system. For example, if it is cold outside, the house will need more energy/heating. If you have an old radiator system, the radiators will require warmer water than modern radiators to generate enough heat. If you have an underfloor heating system, the water will not need to be as hot to achieve sufficient heating.

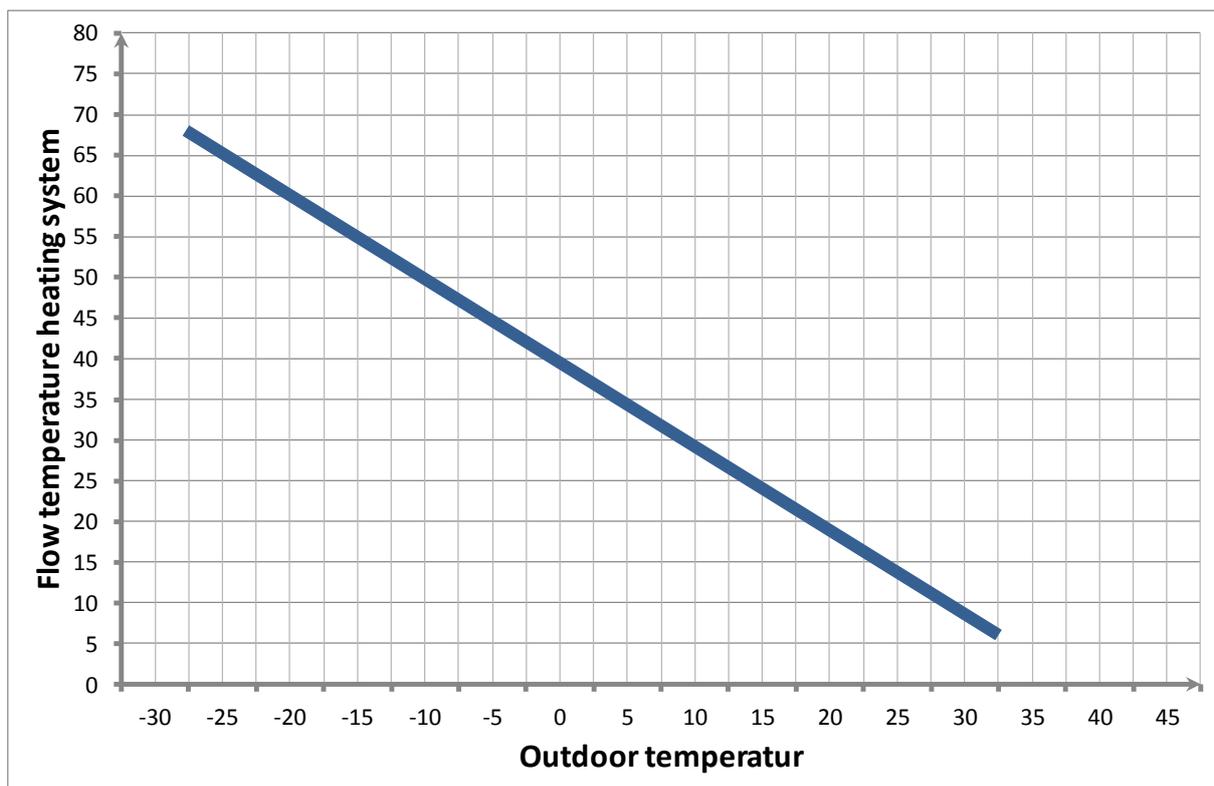
Based on all of these parameters, which vary from house to house, the settings will be unique in each case. We call this the heating curve.

In simple terms, the heating curve can be described as the relationship between the outdoor temperature and the temperature (flow line) that your heating system requires - see the diagram below. You can adjust the heating curve in many different ways so that it is suited precisely for your house, and we will review these in this chapter.



Remember! A house heating curve that is set properly can save a lot of money over the year.

Example of a heating curve. (This is the factory default heating curve)



Setting the curve

There are 3 basic settings for the heating curve, points A, B and C. With these 3 points, you can adjust the gradient and vertical position.

The aim is always to set the curve as low as possible.

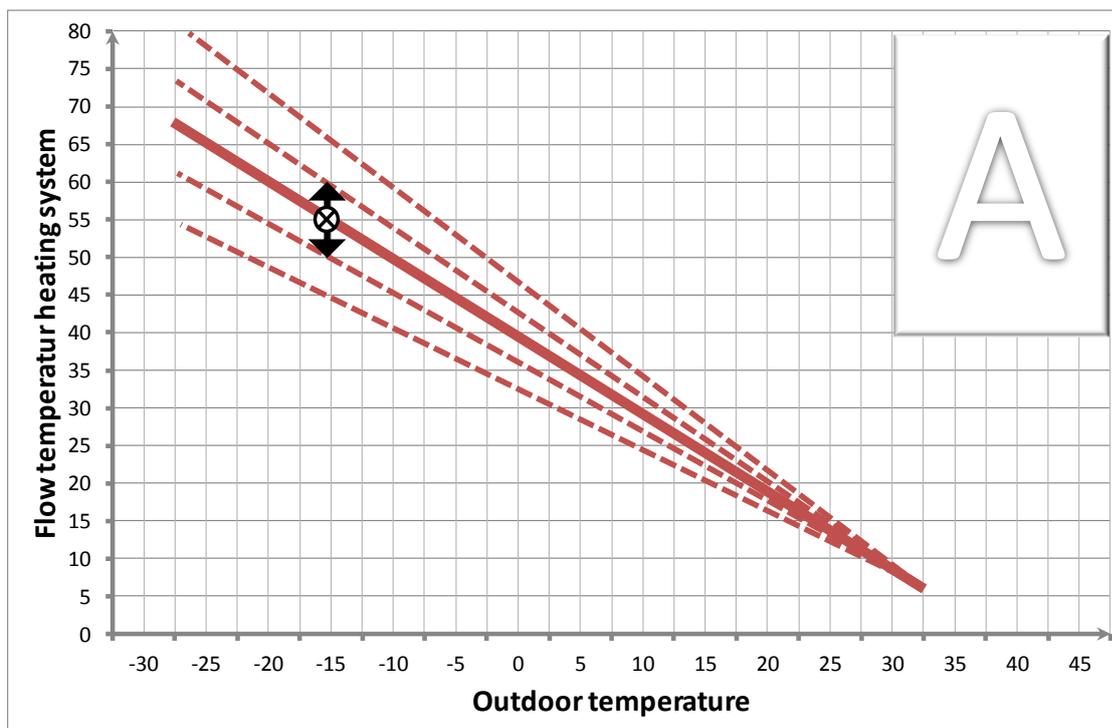
Point A

Point A describes the temperature of the water to be sent to the radiators if the outdoor temperature is -15°C . The factory default setting for this item is 55°C . In other words, when it is -15°C outside, the AquaPaQ unit sends 55°C water to the radiators.

When you adjust this point, you change the angle of the entire heating curve. The biggest changes occur when outdoor temperatures are cold - see the graph below.

If you feel that there isn't enough heat when it is below -5°C outside, but there are no problems when it is warmer, you can adjust this point upwards.

Adjusting point A on the heating curve. (The factory default setting 55°C is marked with a cross)



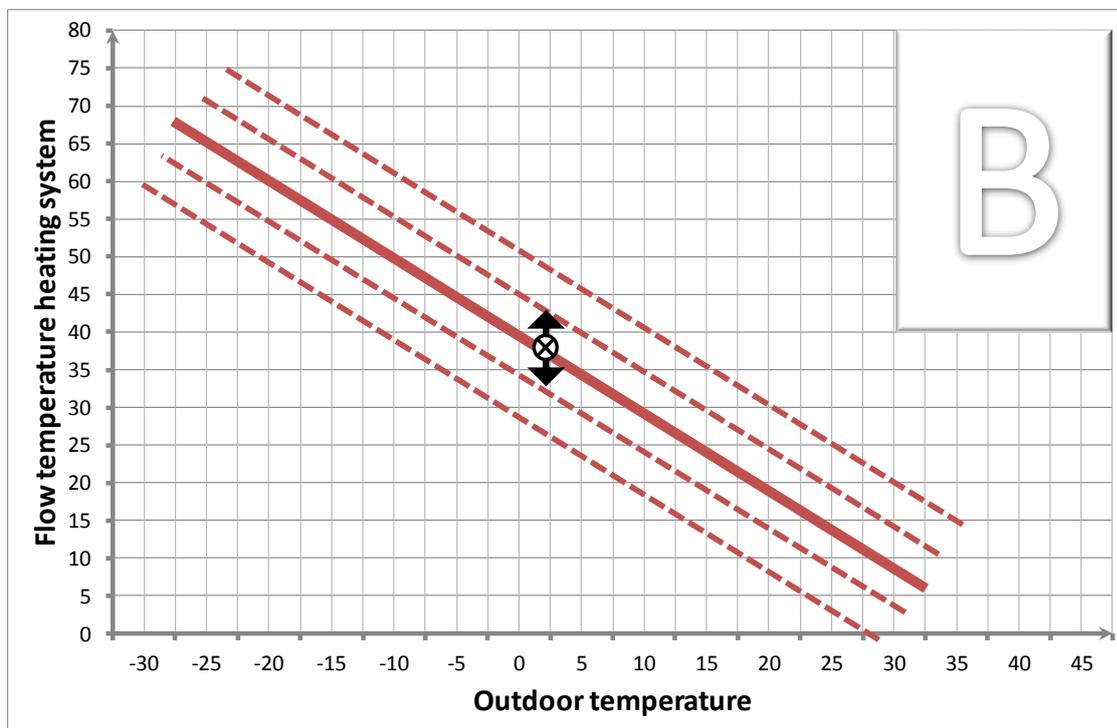
Point B

Adjusting point B means that the entire heating curve moves upwards or downwards (parallel movement). In other words, you don't adjust the gradient for any particular outdoor temperature, rather you adjust the curve for the entire outdoor temperature range. The factory default setting is 0°C, i.e. no movement at all. If you increase this value, the curve moves upwards, i.e. becomes warmer, and if you reduce this value, the temperature drops.

This setting is primarily used when you feel that it is too cold (or warm) regardless of the outdoor temperature.

(This is also the setting that should be used when first adjusting the heating curve).

Adjusting point B on the heating curve.



Point C

Point C has 2 meanings.

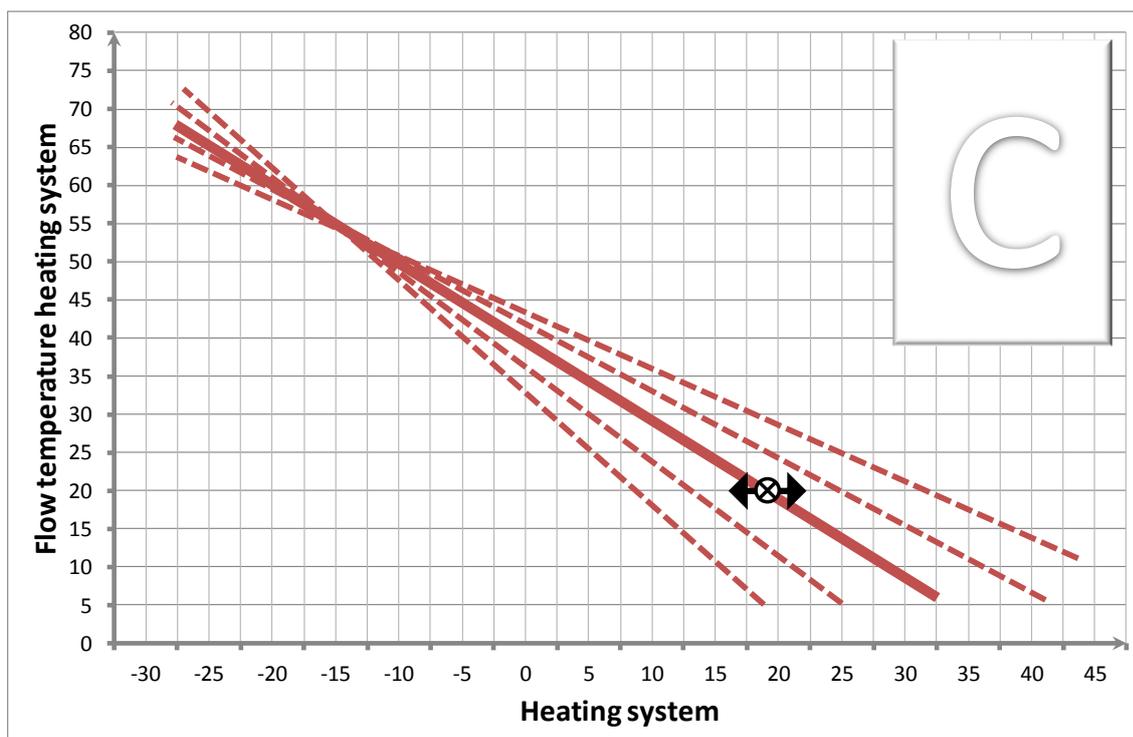
On the one hand, it is used to adjust the gradient of the heating curve during warmer outdoor temperatures, but it is also used as a "shutoff temperature" for the heat to the house.

When the outdoor temperature reaches this temperature and stays there during a settable time, the AquaPaQ stops sending water/energy to the heating system and thereby shut off heating to the house. The settable time is set by your installer and is present in the installers menu.

During summer time when heat is in off-mode both circulation pump and mixing valve, which determines the temperature to the heating system, will be run periodically in order to prevent sticking

If you feel that there isn't sufficient heating when the temperature is above +5°C outside, but there aren't any problems when it gets colder, you can adjust this point upwards.

Adjusting point C on the heating curve. (The factory default value of +17°C is marked with a cross).

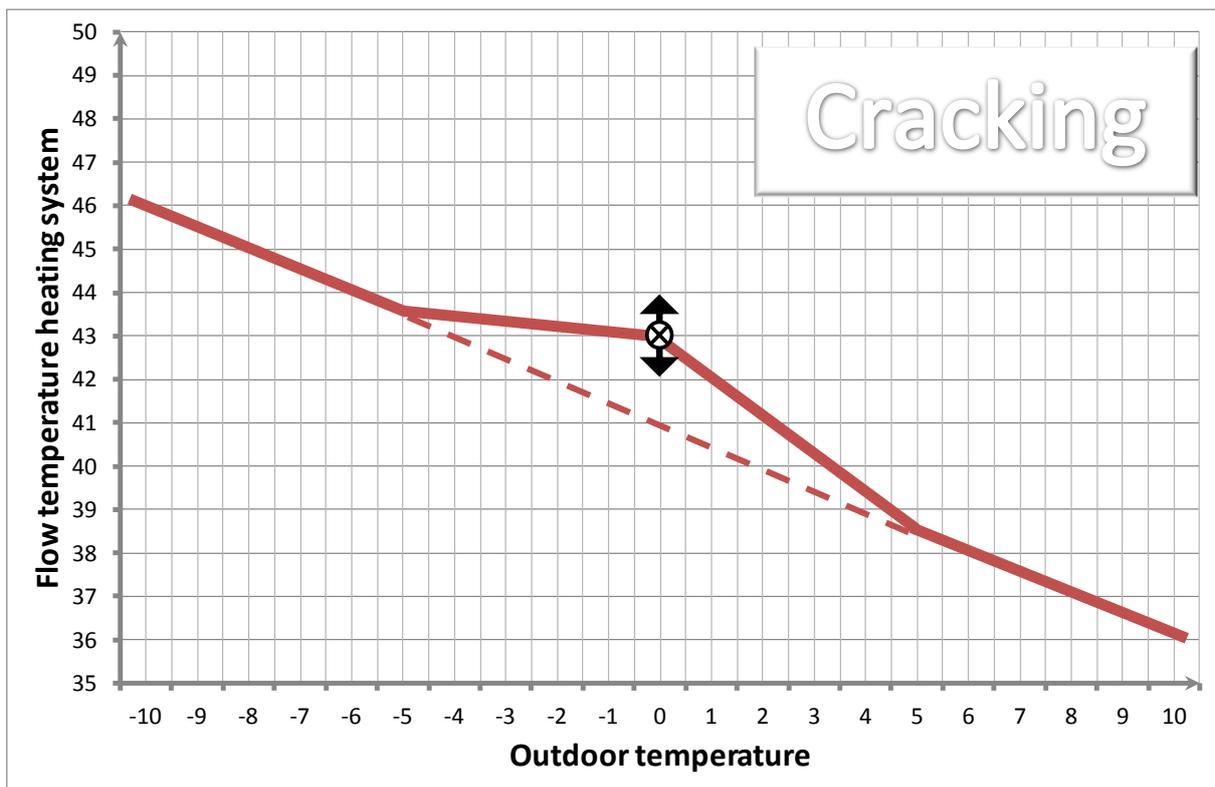


Cracking

When the outdoor temperature is around 0°C and it is very windy, slightly warmer water may sometimes need to be sent to the heating system. We call this adjustment, when the outdoor temperature is 0°C, cracking the curve.

If you feel that there isn't enough heating when it is around 0°C outside, but it is otherwise sufficient, you can increase this setting somewhat.

Adjusting the cracking point. (The factory default value is 0)



Limiting the heating curve

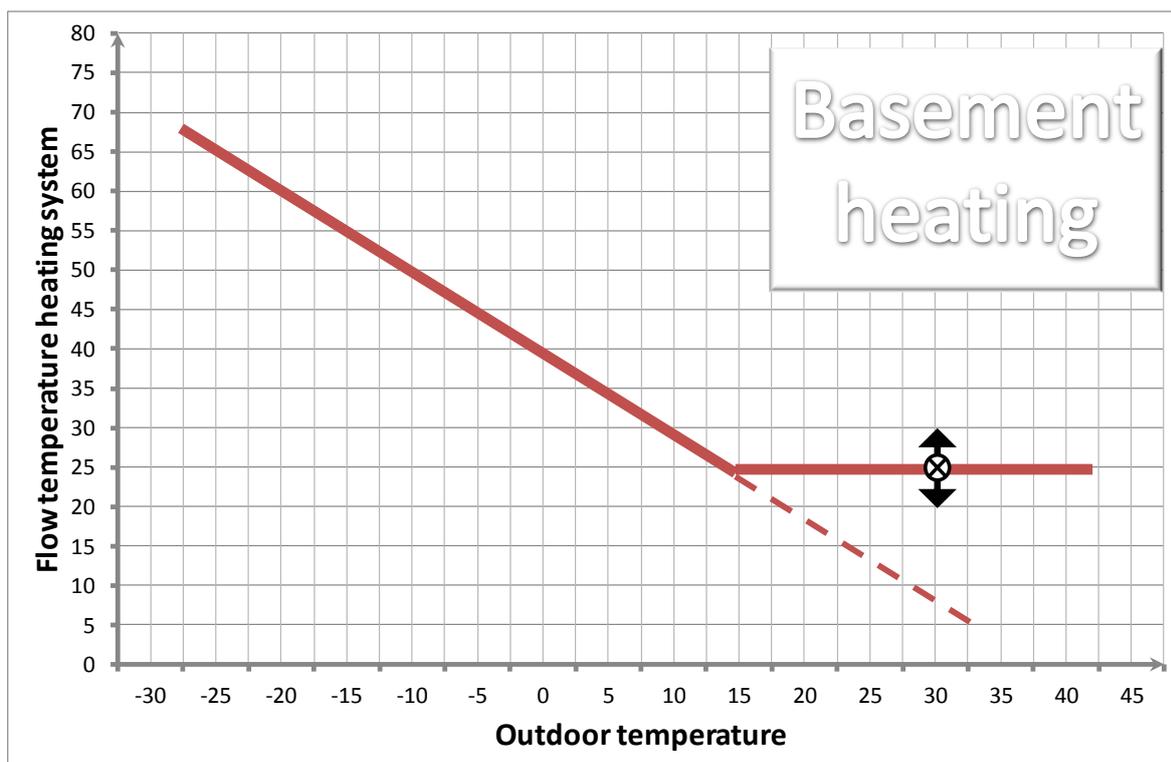
Points A, B and C are all used to set the curve in different positions. There are also 3 other ways for adjusting the curve. Basement heating, underfloor heating and room sensors. These 3 settings do not affect the gradient or the position of the heating curve. Instead, they restrict the curve and allow you to set a minimum and maximum temperature that is sent to the heating system.

Basement heating Basement heating allows you to cancel the function described in point C, "heat off", which means that the AquaPaQ unit stops sending water to your heating system. If you activate basement heating, AquaPaQ will continue to send water at the temperature you set, even if the outdoor temperature is high.

Activate basement heating if you don't want the heating to be turned off even if it is warm outside. This applies primarily when you have a basement that needs a certain amount of heating even in the summertime, or a bathroom with underfloor heating coils that you want to keep warm in the summertime as well.

(In the example below, basement heating is set to 25°C)

Adjusting "basement heating" on the heating curve.

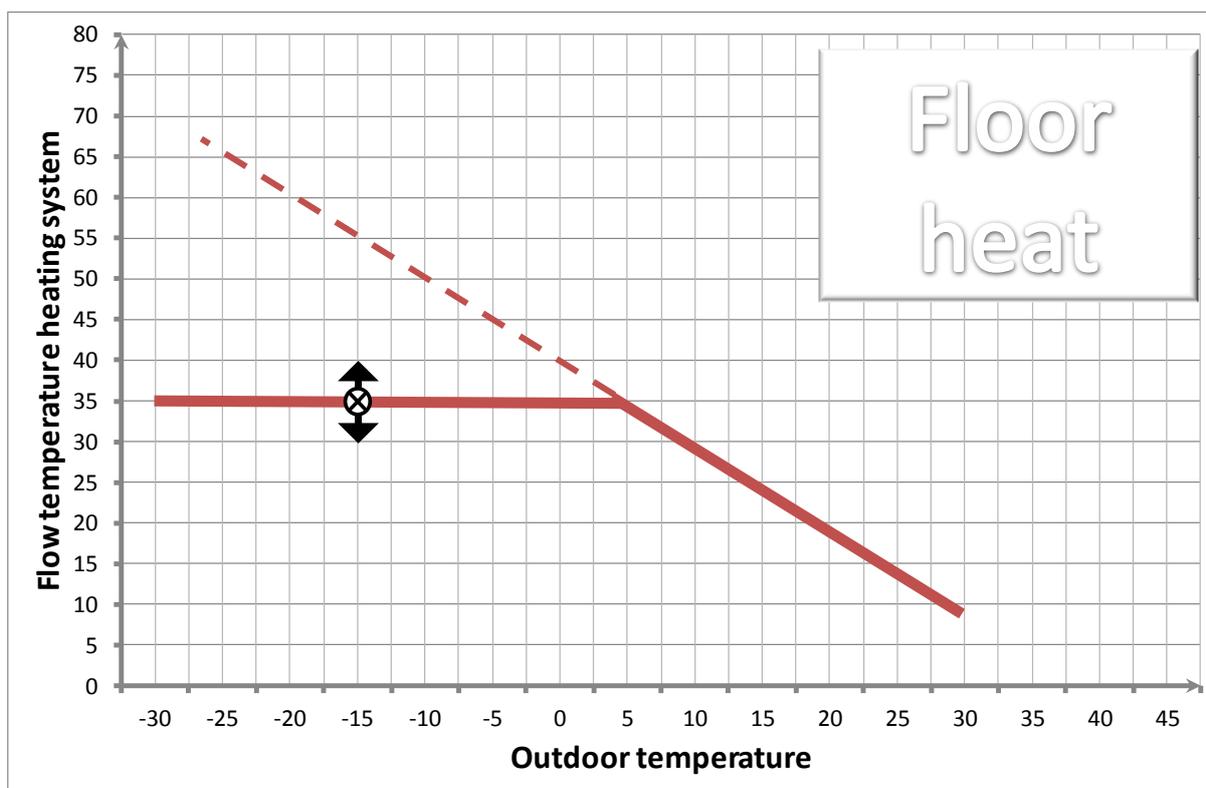


Underfloor heating

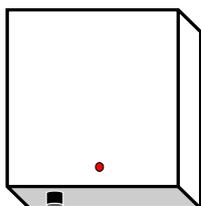
Underfloor heating is the opposite of basement heating. Underfloor heating limits the heating curve and sets the maximum temperature at which water can be sent to your heating system, regardless of how cold it is outside. Note that your installer must unlock this function in the installer's menu in order for you to be able to view it.

Setting a maximum temperature also allows you to protect your underfloor heating system against excessively high temperatures. This setting is only used if you only have underfloor heating.

Adjusting "underfloor heating" on the heating curve.



Room sensor

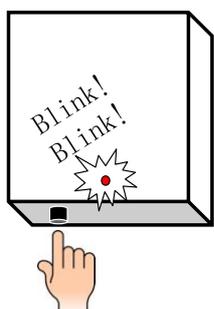


A room sensor is a sensor placed in a central location in your house, which provides information to the AquaPaQ unit regarding the ambient temperature. Depending on how your house is designed, a room sensor may work more or less effectively. If you have a large house with many small rooms, it can be difficult to use room sensors because it may be too cold or hot in the rooms that are far away from the sensor. If you have an open plan house, room sensors are recommended, both for the sake of comfort and from an energy efficiency standpoint.

If you have a room sensor installed, you can decide whether it should be used to compensate the heating, i.e. be allowed to affect the heating curve. If it becomes warmer than your original setting, the AquaPaQ will

reduce the heat to your radiators/underfloor heating system. The greater the difference, the cooler the water that is sent out. The same is true if the temperature in the room decreases, then the AquaPaQ will increase the temperature to the heating system. This adjustment will take place continuously, which means that the appearance of the heating curve will be constantly changing.

Block temporarily



The button placed on the room sensor can be used for different functions of your own choice. One of these functions is to temporarily block the sensors impact on the heating curve. This function is of interest if you for example have an open fireplace placed in the same room as the sensor. When you add heat to the room with the fire place the sensor will stop the heat to the complete heating system, i.e. all rooms will be affected. However, if you use this function you can set a time delay in hours for blocking of the sensor when you want to use the fire place. When you press the button the activation will be confirmed by 2 blinks from the red diode. Observe that you have to have set this function first in the menu: "Settings" -> "For customer" -> "Function button". Further information in the chapter "Menu function button"

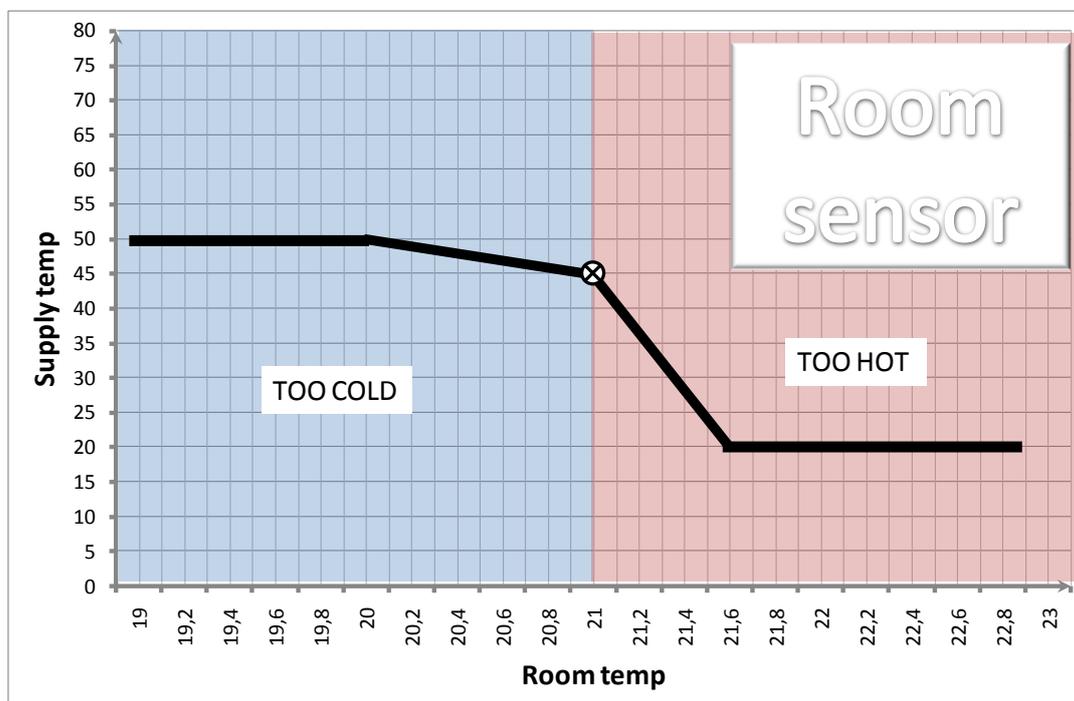
Example of the room sensor function. The set value for room temperature is 21.0°C and the heating curve has decided the supply temperature to 45°C.

Too hot

If the temperature in the house rises, the temperature in the heating system will gradually decrease by 2-6°C per 0,1°C difference in the room temperature. When the temperature difference reach 0,6°C no more heat will be sent to the heating system. In the example this point is 21,6°C.

Too cold

If the temperature in the room decreases the temperature will gradually increase with 0,5°C per 0,1°C difference in room temperature. The maximal increase the room sensor can achieve is 5C above the set heating curve.



Why is the heating curve important?

Now we have gone through the settings for the heating curve, and the importance of properly setting the heating curve has been highlighted. Why is this so important?

Well, the heat pump doesn't act like a oil-based furnace, wood stove or electric boiler, where the temperature does not have as great an impact on efficiency.

The effectiveness/efficiency of the heat pump is called the COP and is a measure of how much energy you get back in relation to how much you put in. COP = 3 means that if you put in 1 kWh of energy, you get 3 kWh of energy back out.

The efficiency, COP, of the heat pump depends on many different parameters, but there is a clear connection between the water temperature in the heat pump and COP. The hotter the water that the heat pump must produce, the lower the degree of efficiency, COP, and the lower the cost savings. This means that in order to optimise your savings, the heating curve needs to be set as low as possible. If the heating curve is set too high, the heat pump generates water that is warmer than necessary and therefore has a lower degree of efficiency.



The best savings for your heating system come from setting the water temperatures as low as possible!

In practice

It can take a long time to set up the perfect house heating curve for your house, and you may need to adjust it a number of times. Above all, it will need to be adjusted when the outdoor temperature drops.

There are a few basic tips that should be followed.

Radiator thermostats

All radiator thermostats should be completely open when you set your heating curve. Otherwise, the risk is that the AquaPaQ unit will send out water that is warmer than necessary.

Adjustment

With the thermostats completely open, try reducing the heating curve using the settings in this chapter, e.g. heating curve point B. Wait a few days and see whether the comfort level is satisfactory. When you find a setting where it is sufficiently warm in the coolest room in the house, you can fine-tune the thermostats on the radiators in the other rooms.

Room sensors

Room sensors make adjustment easier, because the system itself decreases the heating curve when necessary.

Remember that raising the room temperature by one degree means that approximately 3-5 °C warmer water needs to be produced.

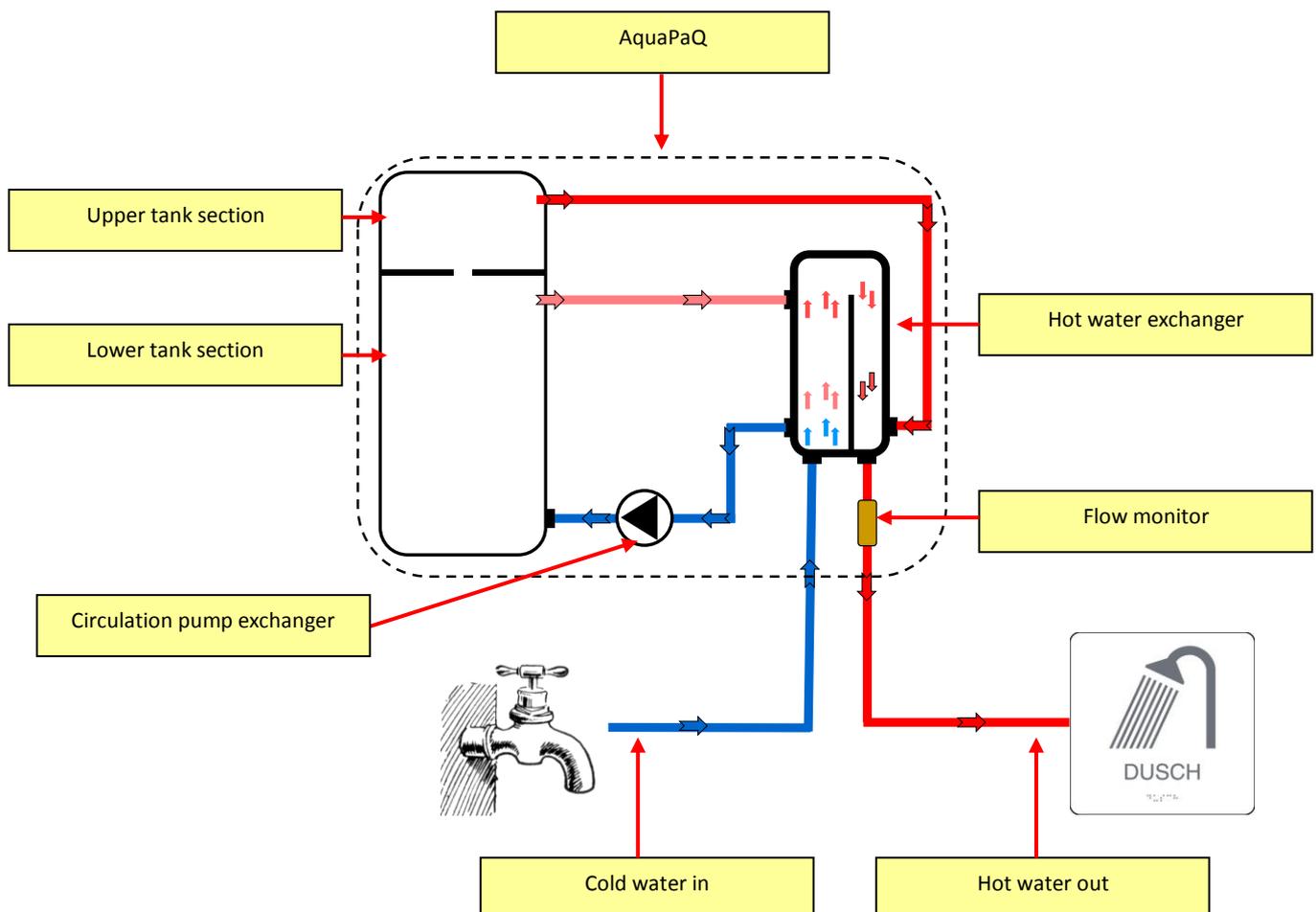
Hot water

In addition to heating in your home, having domestic hot water available is obviously also important. The AquaPaQ primarily uses the heat pump with its special exchange valve technology to produce hot water. You can influence how your hot water is produced, and your choice will affect both the amount of hot water and the efficiency of the heating system.

Just as with heat for your house, which you can read about in the previous chapter, there is a connection between the temperature of the hot water and the savings you can achieve. High temperatures always mean lower savings. Using AquaPaQ's unique hot water exchanger, you can have a good level of domestic hot water with optimal savings.

How hot water is produced

The AquaPaQ does not have any container or coils with hot water inside the tank, but fresh hot water is produced continuously using a special hot water exchanger. This exchanger uses water both from the lower tank section, which is often somewhat cooler, and from the upper tank section, which always has hot water. The lower tank section preheats the incoming cold water, and the upper tank section is used to top up the temperature so that the water is really hot. The AquaPaQ only heats hot water when you are using it. A flow monitor senses when the hot water is being used and starts a pump that sends water from the lower tank section through the exchanger that heats the warm water. See the diagram below.



Hot water - settings

You can use a number of settings to influence hot water production in your AquaPaQ.

Economy or priority

One basic decision to be made is whether you want to have extra domestic hot water or whether you want to prioritise saving as much money as possible. In most cases, the economy setting provides enough hot water, but if you have large bath tubs, a jacuzzi, etc. you may want to select the priority hot water setting.



Remember! Always start with the economy setting and see whether this provides enough hot water for your needs.

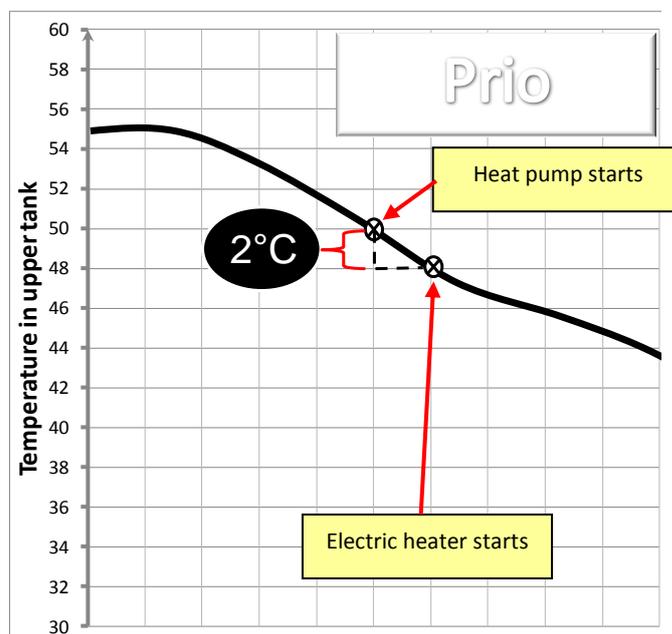
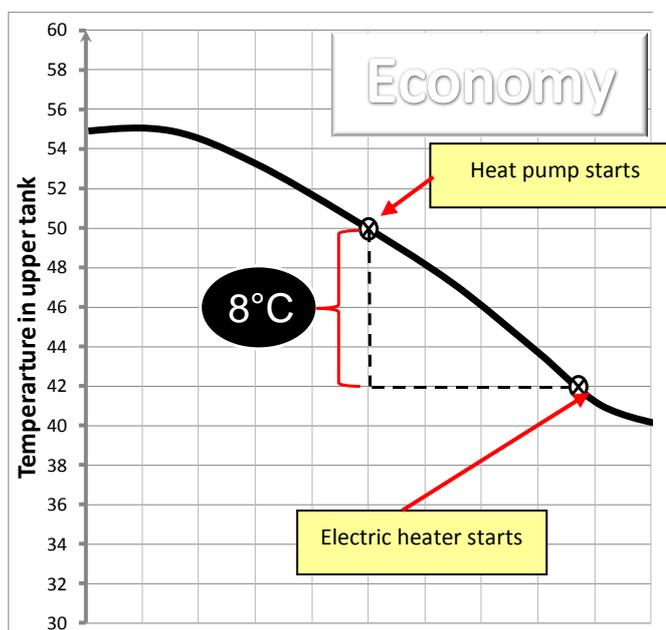
Economy

The economy setting means that the hot water pump in the AquaPaQ unit has more time to try to heat the water in the upper tank. When you use hot water from the AquaPaQ unit, primarily when showering or filling the bathtub, the temperature in the upper (and lower) section will drop. The heat pump will start when the temperature has dropped a few degrees. If the temperature continues to drop, the electric heater may also need to start. If you use the economy setting, the temperature is allowed to drop further before the electric heater is allowed to start. This gives the heat pump the option of heating up the water instead, which is the most economical solution.

Priority

The priority setting means that the electric heater starts sooner if the temperature in the upper section of the tank drops. This provides better hot water performance, but it also costs more to heat the water.

The figures below show what happens in the economy and priority mode when the temperature in the upper tank section drops.



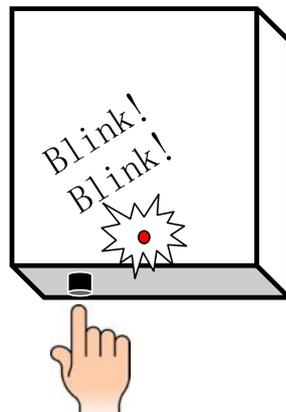
Extra hot water

The button placed on the room sensor can be used for different functions of your own choice. One of these functions is the function "Extra hot water". The function gives the possibility to temporarily increase the hot water performance of the AquaPaQ. This function can be used if for example many people need to shower quickly after each other, many showers used at the same time or if a bigger bath tub/Jacuzzi should be filled.

When you press the button the activation will be confirmed by 2 blinks from the red diode. Observe that you have to have set this function first in the menu: "Settings" -> "For customer" -> "Function button". In this menu it's possible to set a desired temperature in the tank and also if only the heat pump should be used for the heating or both heat pump and electric heater.

Further information in the chapter "Menu function button"

Observe that it will take 15-30min for the heat pump to increase the tank temperature.



Upper tank temperature

You can set the temperature that you want to be maintained in the upper tank yourself. As mentioned previously in this chapter, a higher temperature setting costs more, but the level of comfort is somewhat better. If you set the temperature to a very high level, above 60°, this may mean that the heat pump cannot manage to heat the upper tank by itself but needs the electric heater to help out.

The factory default setting for the upper tank temperature is 53°C. Try reducing this temperature setting a few degrees and see whether the hot water temperature is satisfactory for your requirements. This allows you to save even more money.

If your house (heating system) needs water that is warmer than the temperature that you set on the upper tank section, the heating curve for the upper tank will be applied.

Base heat

Base heat is the lowest temperature to which the AquaPaQ unit allows the temperature to drop in the lower tank section, even if the heating system doesn't need very hot water.

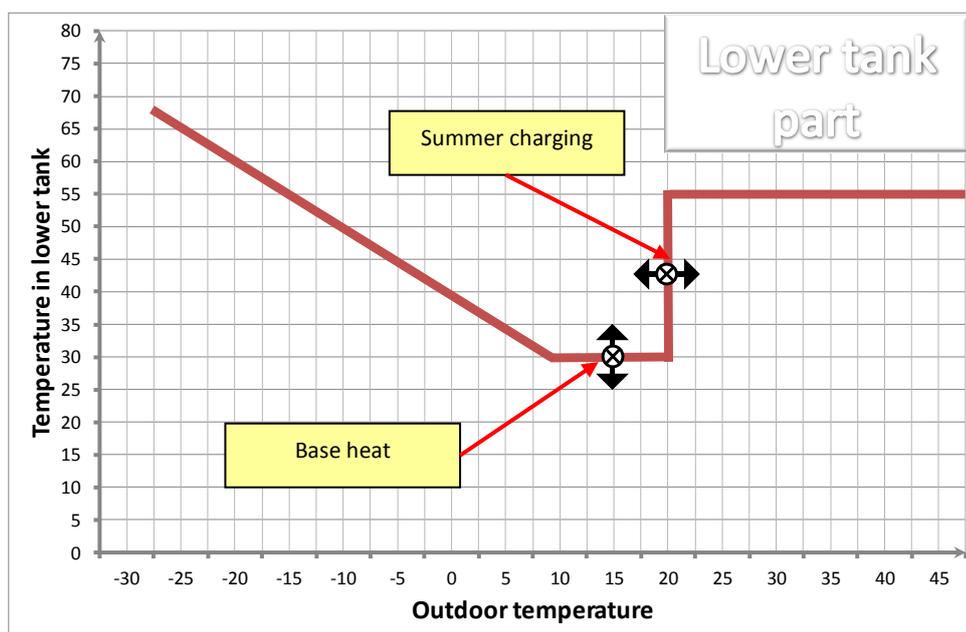
The reason for this setting is so that you can have a good amount of hot water even when your house doesn't need so much heat. This is because the water in the lower tank section is used to preheat your hot water. If you want to increase the amount/volume of hot water, you can raise this value somewhat.

Summer charging

During the summertime, your house needs very little heating, or none at all. In order to increase the running time for the heat pump and increase the amount of domestic hot water in the summertime, you can set a temperature where the heat pump charges the entire lower section of the tank, so-called summer charging.

AquaPaQ goes into summertime mode if the outdoor temperature has been above the set value for at least 8 hours. The system remains in summertime mode for at least 12 hours, or for as long as the outdoor temperature is above the set temperature. This is to prevent the AquaPaQ unit from switching between summer charging and heating according to the heating curve during summer nights.

Settings that affect the lower tank section temperature. The figure shows "base heat" set at 30 °C and summer charging at 20 °C



Display

All of the adjustable settings can be adjusted via the display and the 6 buttons. The display allows you to see current system information as well as any activated alarms.

Overview

Operating indicator

A solid green light on the right-hand side during normal operations indicates that everything is running fine. If a fault occurs, the light will turn red. If the light flashes red, this means that the error is active and cannot be reset by pushing buttons. If the light is solid red, this means that an alarm has been triggered, but it is no longer active and can be reset.

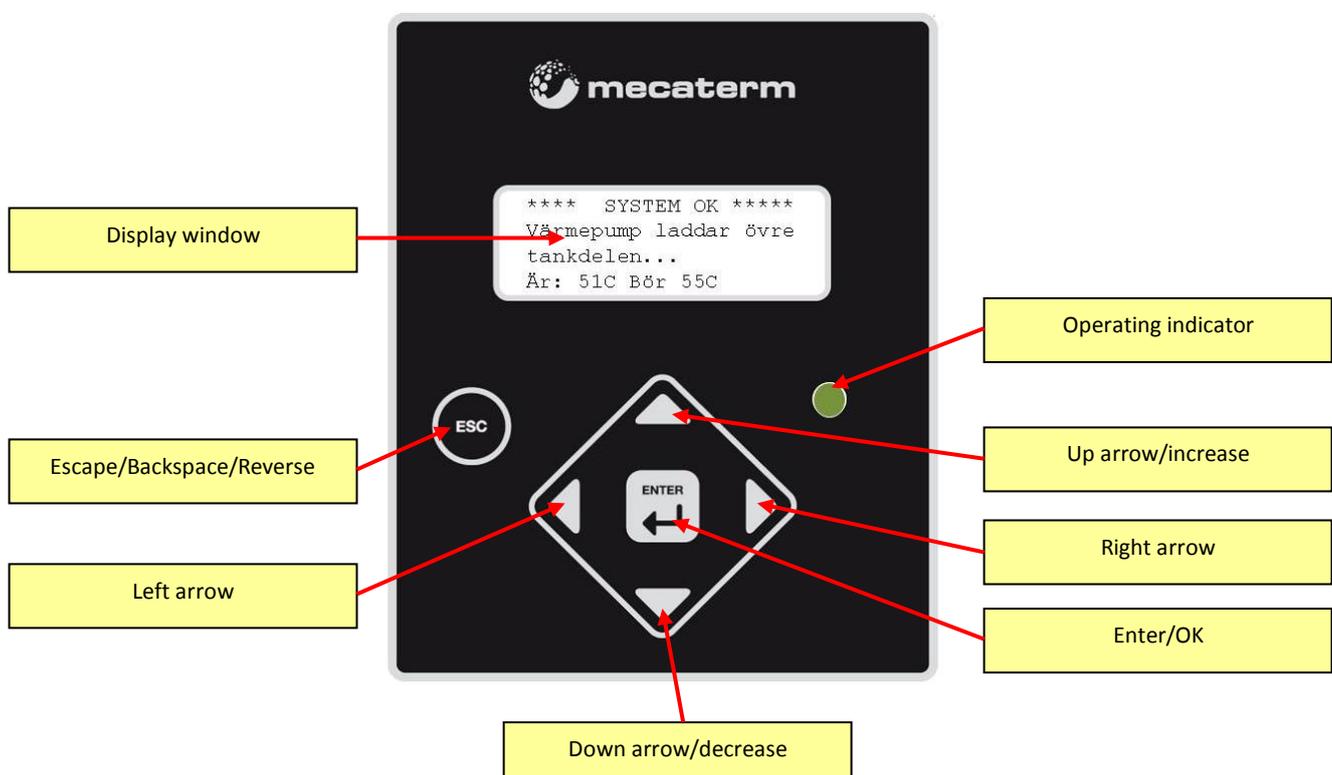
Buttons

Up/down arrow: Up/down arrow is used to browse up and down through the different menu trees but also to increase or decrease a value for the various settings.

Left/right arrow: Use the right arrow to move up one step in the menu tree when there are submenus and to activate a change in any of the settings. (Right arrow is used to move backwards when entering codes)

ENTER: Enter is used to confirm a setting, i.e. when you are inside a setting, you can confirm any changed values by pushing the Enter button.

ESC: Escape is used to move upwards in the menu system, i.e. if you are at level 4 in the menu and hit the escape button, you will go up to menu level 3. Escape is also used to reverse a setting.



Menu modes

There are 2 main groups of displays:

- Automatic mode/Alarm
- Menu system

You cannot browse in automatic mode, rather it displays the most current information in the system, e.g. current values for tank temperatures or the status of the heat pump. If one or more alarms are triggered, this is displayed in this mode.

The menu system is the mode where you can browse through the different displays and see the current values and/or adjust settings for the system.

Use "ESC" to switch between the 2 modes. If you have been in menu mode and not touched any of the buttons for at least 15 minutes, the display will return to the automatic mode/alarm.

Adjust a setting

In order to adjust a setting, you must be in a display that contains something that can be adjusted. All of the setting displays are in the "Settings" submenu.

When you are in a settings display, there is either a number or a yes/no option. All of the adjustable parameters have an arrow in front of them (→). To activate the setting, press the right arrow. This will make the arrow change shape and will start to flash. Now you can use the up/down arrows to adjust the value.

Example 1

Press the right arrow to activate the setting

```
Heat curve point B:
Parallell adjustment
of heating curve
(+/-) : →0C
```



The arrow starts to flash. Use up/down to change the value.

```
Heat curve point B:
Parallell adjustment
of heating curve
(+/-) : >4C
```



Confirm the change with ENTER or reverse the setting with ESC.

```
Heat curve point B:
Parallell adjustment
of heating curve
(+/-) : →4C
```

Example 2

Press the right arrow to activate the setting

```
Room sensor used for
compensation of
heat curve: →No
```



The arrow starts to flash. Use up/down to change the value.

```
Room sensor used for
compensation of
heat curve: >Yes
```



Confirm the change with ENTER or reverse the setting with ESC.

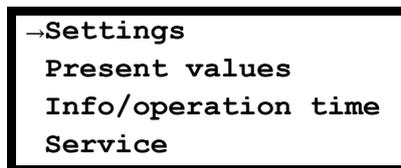
```
Room sensor used for
compensation of
heat curve: →Yes
```

Menu tree

The menu tree has several branches. Some of them can be accessed directly, and some need to be unlocked with a code. The code-locked menus are intended for the installer/service technician and should not be used without thorough knowledge of the system or when contacting a service agent/installer. This section of the manual will describe the menus that are not code-locked.

Main menu

The main menu appears as below and has 4 options.

**Settings:**

This is where you can adjust the settings for the heating curve, among other things, and set the room temperature and the domestic hot water temperature, etc.

Present values:

This branch allows you to see the current values in the system, e.g. tank temperatures, room temperature, electric heater operation, etc.

Info&Run times:

Info&Run times contains operating information that the system saves as well as information about serial numbers and the program version. This is where you can see how much the heat pump has been working in the past 24 hours, for example.

Service:

This menu contains advanced settings and should only be used by a service technician/installer.

Menu - Settings

The menu settings have 3 submenus as below.



For customer:

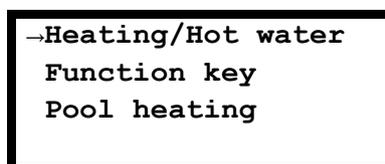
This is where you can adjust the settings for the heating curve, among other things, and set the room temperature and the domestic hot water temperature, etc.

For installer:

This menu contains the settings for the entire system and should only be used by the installer.

Menu - For customer

The "For the customer" menu contains 3 submenus as below.



Heating/Hot water:

Menu for setting of house heating and domestic hot water.

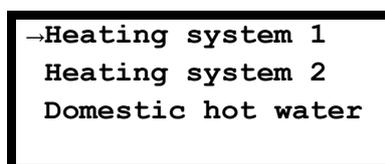
Function key:

Menu for setting of functions for the button on the room sensor.

Pool heating:

If the accessory "Pool heating" is installed this menu will be activated. Please read the instructions supplied with the accessory..

Menu – Heating/Hot water



House heating (1):

This is where you adjust the settings for controlling the heating system, including manually adjusting the heating curve.

House heating (2):

Is only relevant if an extra mixing system is installed (accessories). The menu contains the same settings as for system 1.

Hot water:

This is where you decide how to manage the hot water, e.g. the temperature and whether hot water should be prioritized, etc.

Menu – House heating system 1(2)

Before adjusting the settings in this menu, read through the "Heating curve" chapter.

| Display | Description | Comments |
|---|---|---|
| <p>Room sensor used for compensation of heat curve: →Yes</p> <p>↓</p> | <p>The display allows you to set whether the room sensor will be used to adjust the set heating curve.</p> <p>If the set temperature on the room sensor exceeds the set nominal value (set point) for room temperature, the system automatically reduces the temperature to the heating system. Note that the room sensor can only decrease the heating curve, i.e. reduce the temperature to the heating system, not raise it.</p> | <p>Room sensors must be installed in order for this function to be used.</p> |
| <p>Room temperature Actual: 20.2C Nominal: →20.8C Diff: +0.6C</p> <p>↓</p> | <p>Setting room temperature (if room sensor is installed). The box shows the actual value, the adjustable nominal value and the difference between the actual/nominal value.</p> | <p>Only displayed if room sensors are used to compensate the heating curve.</p> |
| <p>Heat curve point A: Flow temperature to heating system at outdoor -15C: →55C</p> <p>↓</p> | <p>The heating curve (point A) indicates the temperature to be set for the heating system when the outdoor temperature is -15°C.</p> | |
| <p>Heat curve point B: Parallell adjustment of heating curve (+/-): →0C</p> <p>↓</p> | <p>Heating curve (point B) allows you to move the entire heating curve up and down in parallel. Moves the curve up (+), sends warmer water to the heating system at all outdoor temperatures, and the reverse if the curve is moved down (-).</p> | |
| <p>Heat curve point C: Close heating when outdoor temperature is above: →17C</p> <p>↓</p> | <p>Heating curve (point C) indicates the outdoor temperature at which the heat should stop being sent (mixed) to the heating system. Above this temperature, the mixing closes completely, and the radiator pump shuts down.</p> <p>Note that the outdoor temperature must have been above the set temperature for at least 8 hours in order for the heat to be turned off. The same applies (8 hour delay) if the heat is shut off, and the outdoor temperature drops below the set temperature.</p> | |
| <p>Increase house heat At 0C outdoor temp (Crack heat curve) Adjust: →0.0C</p> <p>↓</p> | <p>At outdoor temperatures around 0°C, somewhat warmer water is sometimes needed for the heating system. This setting allows you to increase the heat in the flow line locally at an outdoor temperature of 0°C, so-called cracking. Please read the "Heating curve" chapter.</p> | |
| <p>Floor heating only: Max temperature to floor heating system: →35C</p> <p>↓</p> | <p>If only underfloor heating is installed in the heating system, the water sent (mixed) to the system must not be too hot, which can damage the floor. This selection indicates the maximum temperature that is mixed to the heating system, regardless of the outdoor temperature and the heating curve setting.</p> | <p>Only displayed if underfloor heating is selected in the installer menu</p> |
| <p>Cellar heating: Off Min temperature to heating system: →10C</p> | <p>In certain cases, you may even want to have heat in the system during the summertime, especially in basement areas. This setting provides the option of providing heat for the heating system even if the outdoor temperature is above the set temperature for the heating curve in point C. In order to close off this function, reduce the temperature to 10° C, whereafter "Basement heating: On" is changed to "Basement heating: Off"</p> | |

Menu – Hot water

Before you adjust the setting in this menu, be sure to read the chapter "Hot Water".

| Display | Description | Comments |
|---|--|---|
| <p>Hot water comfort Choice: →Economy (Prio may increase electric heater op.)</p> <p>↓</p> | <p>AquaPaQ has a special technology that allows the heat pump to heat the hot water first. An electric heater is available for backup. With this setting, you can decide whether the electric heater should come on immediately after the temperature drops in the upper tank section or if the system should wait until the temperature falls even further.</p> <p>Economy This means that the temperature is allowed to drop further before the electric heater starts.</p> <p>Priority Means that the electric heater can start at an earlier temperature. Note that the priority setting means that the electric heater runs longer.</p> | <p>Only displayed if a heat pump module is installed.</p> |
| <p>Temperature for upper tank part: →53.5C (Higher values may increase el.h op.)</p> <p>↓</p> | <p>Setting for the nominal value in the upper tank section, i.e. the section used to top up the temperature of the hot water before sending it out. Note that the heat pump operation will be limited if the heat settings for the tank are high, as this will mean that the electric heater must be used. Before increasing the values in this menu, read the chapter "Hot water".</p> | |
| <p>Min allowed temperature in lower tank part. (Basic heat): →35C</p> <p>↓</p> | <p>Normally, the heat pump works with a preset heating curve +5°C in the lower tank section, so-called floating condensation. Since the lower section of the tank is used to preheat the hot water, the temperature should not be too low. Base heat is the lowest temperature to which the heat pump allows the lower tank section to drop, even if the heating curve doesn't require such a high temperature.</p> <p>To increase hot water performance, this temperature may be raised.</p> | |
| <p>Charge tank to maximum temperature when outdoor temperature above: →20C</p> | <p>During the summertime, when the house doesn't need a lot of heating, you can allow the heat pump to work on creating a higher temperature in the entire tank. This extends the running times of the heat pump and provides plenty of domestic hot water.</p> <p>In practice, this means that above this outdoor temperature, the system ignores the heating curve and heats the lower and upper sections of the tank up to the value in the display below.</p> <p>There are time delay options to prevent the system from switching between summer charging and charging according to the heating curve when the outdoor temperature exceeds/drops below the set value.</p> <p>The system goes into summer charging mode if the outdoor temperature has remained above the preset value for at least eight hours. The system remains in summertime mode for at least 12 hours, or as long as the outdoor temperature is above the preset temperature.</p> | <p>Only displayed if a heat pump module is installed.</p> |
| <p>Tank temperature During summertime (upper+lower tank) →53C</p> | <p>Setting for desired tank temperature when the heat pump is in summer charging mode according to the display above. (Note that the entire tank will be charged with hot water, which is why this setting should not be set - and should not need to be set - too high).</p> | |

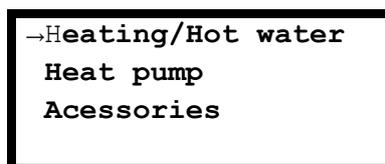
Meny – Function button

This menu gives possibility to set a function for the button placed on the room sensor unit.

| Visning | Beskrivning | Kommentarer |
|---|---|--|
| <p>Choice of function for button on room sensor: →"TEXT"</p> <p style="text-align: center;">↓</p> | <p>Here you choose what type of function you want the room sensor button to have when you press the button.</p> <p>Not used This is the default setting. Room sensor button is inactivated and nothing will happen if the button is pressed.</p> <p>Reset errors If the system generates some kind of error the button on the room sensor can be used to reset the error. (Observe that if the error is still active it cannot be reset with the button.)</p> <p>Extra hot water The button placed on the room sensor can be used for different functions of your own choice. One of these functions is the function "Extra hot water". The function gives the possibility to temporarily increase the hot water performance of the AquaPaQ. This function can be used if for example many people need to shower quickly after each other, many showers used at the same time or if a bigger bath tub/Jacuzzi should be filled.</p> <p>Deactivate room sns This function is of interest if you for example have an open fireplace placed in the same room as the sensor. When you add heat to the room with the fire place the sensor will stop the heat to the complete heating system, i.e. all rooms will be affected. However, if you use this function you can set a time delay in hours for blocking of the sensor when you want to use the fire place. When you press the button the activation will be confirmed by 2 blinks from the red diode</p> | |
| <p>Function: Extra domestic hot water Heating up mode: →Heat pump only</p> <p style="text-align: center;">↓</p> | <p>If the function extra hot water is chosen also this display will be available. Here you can choose how the heating of the extra domestic hot water should be done. It's possible to choose between "Heat pump only" and "Heat pump + electric heater". The latter will fasten up the heating.</p> | <p>Only displayed if extra hot water is chosen.</p> |
| <p>Function: Extra domestic hot water. Desired temp in tank: →55C</p> <p style="text-align: center;">↓</p> | <p>In this menu you can set the desired temperature in the tank when the function "Extra domestic hot water" is activated. Higher settings will increase the amount of domestic hot water. Observe that the heat pumps maximum temperature is about 58C. If higher temperature is chosen both heat pump and electric heater must be used, see previous menu.</p> | <p>Only displayed if extra hot water is chosen.</p> |
| <p>Function: Extra domestic hot water. Extra heat valid during: →30minC</p> <p style="text-align: center;">↓</p> | <p>Here you can set for how long time you want the function to be active. (Observe! It can take 15-30min for the heat pump to increase the tank temperature enough)</p> | <p>Only displayed if extra hot water is chosen.</p> |
| <p>Function: Deactivate room sensor Room sensor is deactivated during: →4h</p> | <p>If you have chosen the function deactivate room sensor this display will be available. Here you can choose for how long time you want to deactivate the room sensor when the button is pressed. After the set time delay the room sensor will return to normal mode again and start to adjust the heating curve.</p> | <p>Only displayed if deactivate room sensor is chosen.</p> |

Menu – Present values

The present values menu has 3 sub menus as shown below.



Heating / Hot water: Here you see the current values for the tank temperatures, the temperature of the water in the radiators / underfloor heating, room temperature, etc.

Heat pump: Here you see the heat pump's different temperatures and operating status.

Accessories: The accessories menu is only accessible if any accessories are installed, e.g. solar panels, pool heating, etc.

Menu – Heating/Hot water

| Display | Description | Comments |
|--|---|--|
| <div style="border: 2px solid black; padding: 5px;"> Room temperature (1) Actual: 20.2C Nominal: 20.8C Diff: +0.6C </div> | <p>Actual room temperature, set nominal value and the difference between the current value and the nominal value.</p> | <p>Only displayed if room sensors are installed.</p> |
| ↓ | | |
| <div style="border: 2px solid black; padding: 5px;"> Heating system (1) Heat: <input checked="" type="checkbox"/>ON <input type="checkbox"/>OFF Act:36.2C Nom: 35.7C Outdoor temp: 11.1C </div> | <p>Current information for your heating system, i.e. radiators / underfloor heating.</p> <p>Heat On/Off shows whether any water from the AquaPaQ unit is being sent (mixed) to your heating system. If the heat is set to "Off", this means that there is no need to heat the house and no water is circulating in the heating system.</p> <p>Actual value is the temperature of the water being sent to the heating system.</p> <p>Nominal value is the temperature that the system has calculated is needed to heat the house. This temperature varies depending on the outdoor temperature, the room temperature and how the heating curve is set up. Please also read the chapter "Heating curve".</p> <p>Outdoor temp displays the current outdoor temperature</p> | |
| ↓ | | |

Menu – Heating/Hot water

| Display | Description | Comments |
|---|---|---|
| <p>Chosen function room sensor button: Extra hot water Time:50min Act:Yes</p> | <p>When using the function button on the room sensor for extra hot water this display will be available. Here you can see the set time for extra hot water and also if the function is activated or not.</p> | <p>Only displayed if extra hot water function is chosen.</p> |
| ↓ | | |
| <p>Chosen function room sensor button: Block room sensor Time:4h Act:Yes</p> | <p>When using the function button on the room sensor for the function deactivate room sensor this display will be available. Here you can see the set time for blocking of the sensor and also if the function is activated or not.</p> | <p>Only displayed if deactivate room sensor function is chosen.</p> |
| ↓ | | |
| <p>Chosen function room sensor button: Reset errors Active: No</p> | <p>When using the function button on the room sensor for resetting errors this display will be available. To test the function push the button and make sure the "Active" changes from "No" to "Yes"</p> | <p>Only displayed if reset error function is chosen.</p> |
| ↓ | | |
| <p>Mixing valve motor 1 <input checked="" type="checkbox"/>Opens <input type="checkbox"/>Closing <input type="checkbox"/>Waiting <input type="checkbox"/>Off Difference: -0.6C</p> | <p>Current status of the mixing valve motor (which ensures that the right temperature is sent to your heating system). The mixing motor opens and closes continuously so that the difference between the current value and the nominal value is 0. In the "Waiting" mode, the system waits to see what kind of effect the previous adjustment (opening or closing) has had. If the status is "Closed", the mixing is completely closed and no heat is needed.</p> | |
| ↓ | | |
| <p>Hot water tapping ongoing: <input type="checkbox"/>Yes <input checked="" type="checkbox"/>No Length of last tapping: 6min 27sec</p> | <p>Information about when hot water is used and how long since the last tapping.</p> | |
| ↓ | | |
| <p>Temp lower tank part Actual: 38.2C Nominal: 40.0C Startdiff HP: 5.0C</p> | <p>Information about status of lower tank section.</p> <p>Actual value is the current temperature in the lower section of the tank.</p> <p>Nominal value is the temperature that the system has calculated that the heat pump must maintain in the lower tank section in order to supply the required heating for the house. This temperature varies depending on the outdoor temperature, room temperature and how the heating curve is set.</p> <p>Startdiff HP is the so-called hysteresis, or the difference from the nominal value required for the heat pump to start heating the tank section. In the current display, the temperature must drop by at least 5°C from the nominal value, i.e. a restart occurs when the lower tank section reaches 35.0° C.</p> | |
| ↓ | | |

| Display | Description | Comments |
|---|---|---|
| <div style="border: 2px solid black; padding: 5px;"> <p>Temp upper tank part Actual: 52.2C Nominal: 55.0C Startdiff HP: 5.0C</p> </div> <p style="text-align: center;">↓</p> | <p>Information about status of upper tank section.</p> <p>Actual value is the current temperature in the upper section of the tank.</p> <p>Nominal value is the temperature set in the settings menu for the heat pump to maintain. (If the house requires higher temperatures than the one set, this value will become the nominal value).</p> <p>Start diff HP Same explanation as in previous display but applies to the upper tank section.</p> | |
| <div style="border: 2px solid black; padding: 5px;"> <p>Standby active XXX Time: 18min</p> </div> <p style="text-align: center;">↓</p> | <p>This view will be present if the installer has installed external equipment, for example time relay, that block operation for electric heater, heat pump or both. XXX can be the following:</p> <ul style="list-style-type: none"> - Standby el. heater - Standby heat pump - Standby el.h+heatp. | <p>Only displayed if system set in standby by external device</p> |
| <div style="border: 2px solid black; padding: 5px;"> <p>El.heat: 7.5 kW (10.5) Power distribution 1.5 kW -- -- L3 2.0 kW L1 L2 L3 </p> </div> <p style="text-align: center;">↓</p> | <p>Information about electric heater operation</p> <p>The top row shows how much power is currently connected to the system. The value in parentheses is the maximum permissible power for the electric heater. The installer will have set this maximum power.</p> <p>The display example on the right shows a 7.5 kW connection and the maximum power of 10.5 kW.</p> <p>The bottom 2 rows show which of the 3 phases are being charged by the electric heater and with how much power. During charging, a signal will flash alternately between "on" and "L1(2)(3)"</p> <p>In the display example on the right, phase L1 is charged with 2.0 kW, phase L2 with 2.0 kW and phase L3 with 1.5 + 2.0 = 3.5 kW</p> | |
| <div style="border: 2px solid black; padding: 5px;"> <p>Main fuse size: 20A Ph. L1 L2 L3 Act 13.9 9.2 14.0 Diff 6.1 10.8 6.0 </p> </div> <p style="text-align: center;">↓</p> | <p>Current information for the load on your distribution panel, and the size set for the main fuse.</p> <p>The "Actual" column shows how much current is presently being consumed on each phase, L1, L2 and L3.</p> <p>The "Diff" column shows how much capacity remains before the maximum limit on the main fuse is exceeded.</p> | <p>Only displayed if current transformers are installed</p> |

| Display | Description | Comments | |
|---|--|--|---|
| <div style="border: 2px solid black; padding: 5px;"> <p>Electric heater Power limited: Yes Need: 9.0 kW Connected: 4.5 kW</p> </div> | <p>The display shows if the power on the electric heater is restricted because the current is too high, which risks tripping the main fuses.</p> <p>Need is the power that the heating system currently needs from the electrical heater.</p> <p>Connected is the power that is presently connected to the electrical heater.</p> <p>(If the power is not restricted, "Need" and "Connected" will display the same value.)</p> | <p>Only displayed if current transformers are installed</p> | |
| <p>↓</p> | <div style="border: 2px solid black; padding: 5px;"> <p>Upper tank part is needed for heating system (1): No Active delay: 180min</p> </div> | <p>The water sent out to the radiators/underfloor heating can come from 2 places in the AquaPaQ unit; from the lower tank section or from the upper tank section.</p> <p>In normal cases, water is only sent (mixed) from the lower part of the tank because this is the "cheapest" water in the tank (lower temperature).</p> <p>If the energy in the lower tank section is not sufficient, e.g. the house requires more power than the heat pump can provide, energy can be sourced from the upper tank section with the electric heater in it.</p> <p>Before the heating system can take water / energy from the upper tank section, a certain length of time must have passed from when the need arose (the standard is 3 hours). This gives the heat pump the chance to work and see if it can "catch up" to meet the heating needed before opening the upper (more expensive) section.</p> <p>If the display shows that the upper tank section is needed to heat the house, the "Delay" time will start to count down. If the need to get water from the upper tank section disappears, the time delay will revert to the set value if the need for extra heating reappears.</p> <p>If the need for extra heating has been active for 20 minutes, the heat pump will make heating the lower tank section a priority.</p> | <p>Only displayed if a heat pump module is installed.</p> |

Menu – Heat pump

This menu is only displayed if a heat pump module is installed.

| Display | Description | Comments |
|--|--|----------|
| <div style="border: 2px solid black; padding: 5px;"> Water temperature In: 32.4C Out: 54.9C Diff: 22.5C Max temp: 58.0C </div> <p style="text-align: center;">↓</p> | <p>Displays the temperature of the water to the heat pump, the temperature of the heated water from the heat pump to the tank, and the difference between the two. Depending on whether the heat pump is working on the lower or upper tank section, the difference may vary. Most often, the largest difference is when the heat pump is working on the upper tank section.</p> <p>Max water temp indicates the maximum temperature that the heat pump can send to the tank sections.</p> | |
| <div style="border: 2px solid black; padding: 5px;"> Brine temperature In: 2.4C Out: -1.3C Diff: 3.1C Freeze alarm: -10.0C </div> <p style="text-align: center;">↓</p> | <p>Displays the temperature of the liquid (brine in) to the heat pump from the bedrock/ground/lake, and the temperature from the heat pump back to the bedrock/ground/lake. The temperature of the brine can vary depending on the time of year, the type of bedrock/ground, etc.</p> <p>Freeze alarm indicates the lowest temperature that the brine can have before the system stops and an alarm is triggered. (Your installer sets this parameter, which depends on how much anti-freeze liquid there is in the system).</p> | |
| <div style="border: 2px solid black; padding: 5px;"> Hot gas temp: 95C Max allowed tmp: 140C Ch pump speed: 34% Est. flow: 683l/h </div> <p style="text-align: center;">↓</p> | <p>Hot gas temperature (compressor temperature) is the highest temperature in the heat pump and indicates how the heat pump is functioning. The hot gas temperature varies depending on how hot the water needs to be and how cold the brine from the bedrock/ground/lake is.</p> <p>Max hot gas temp is the max temperature allowed. An alarm trips if this temperature is exceeded.</p> <p>Charge pump speed is the current speed of the pump that is moving water through the heat pump (between 0-100%).</p> <p>Estimated flow is the estimated flow in litres per hour that the charge pump provides.</p> | |
| <div style="border: 2px solid black; padding: 5px;"> Compressor currents Current L1: 5.6A Motor protect: 7,3A Difference: +1.7A </div> | <p>Information about the compressor's current power consumption (on phase L1) and what the electronic motor protector is set at. Compressor current should never exceed the current set for the motor protector, otherwise an alarm will be triggered.</p> <p>Difference shows the difference between how much power the compressor is drawing and the set motor protector.</p> | |

Menu – Info & Run times

This menu does not contain any submenus and has information about your system's operation and other important information.

| Display | Description | Comments |
|---|---|--|
| <div style="border: 1px solid black; padding: 5px;"> <p>Total operation time boiler: 3284h S/N: 3465842456 ProgramID: 1.1</p> </div> <p style="text-align: center;">↓</p> | <p>Information about the tank section in AquaPaQ.</p> <p>Total boiler running time is the length of time the unit has been in operation since the first startup, i.e. from when the boiler was installed.</p> <p>Serial number is the unique ID for the boiler. Always provide this for any servicing or maintenance.</p> <p>ProgramID is the current program version for the tank section's circuit board.</p> | |
| <div style="border: 1px solid black; padding: 5px;"> <p>Installed heat pump: Aqua 10 S/N: 426845128 PrgID: 1.2 CanId: 0</p> </div> <p style="text-align: center;">↓</p> | <p>Information about the installed heat pump module in AquaPaQ.</p> <p>Serial number is the unique ID for the heat pump module. Always provide this for any servicing or maintenance.</p> <p>ProgramID is the current program version for the circuit board in the heat pump module.</p> <p>CANid is an identification code for the heat pump module in order for it to communicate correctly with the tank section.</p> | Only displayed if the heat pump is installed |
| <div style="border: 1px solid black; padding: 5px;"> <p>Heat pump total operation: 23547h Compressor total operation: 1674h</p> </div> <p style="text-align: center;">↓</p> | <p>Time history for heat pump module.</p> <p>Total running time is the length of time the module has been running since the first startup, i.e. from when the heat pump was installed.</p> <p>Compressor operation is the length of time the heat pump has been running and heating the tank water.</p> | Only displayed if the heat pump is installed |
| <div style="border: 1px solid black; padding: 5px;"> <p>Heat pump operation last 24 hours Starts: 5 Op.time: 8h 42min</p> </div> <p style="text-align: center;">↓</p> | <p>Information about the heat pump operation over the past 24 hours, the number of starts and the total running time in hours and minutes.</p> | Only displayed if the heat pump is installed |
| <div style="border: 1px solid black; padding: 5px;"> <p>Electric heater Total: 152kWh Last 24h: 3.4kWh Av power 24h: 10.4kW</p> </div> | <p>Operating information for the integrated electric heater.</p> <p>Total kWh is the total electricity consumption for the electric heater since the AquaPaQ unit was installed.</p> <p>Last 24h indicates how many kWh the electric heater has used over the past 24 hours</p> <p>Av power 24h is the average power used by the electric heater in the past 24 hours.</p> | |

Automatic mode / Alarm

When you are not in the menu tree and you are adjusting the settings or looking at the operating values, the screen shows an autogenerated display of what is happening in the AquaPaQ. If an alarm is tripped, this is displayed instead of the normal displays.

Normal operation

During normal operation (no alarms), the screen switches continuously between different displays, depending what is happening in the heat pump.

(Any necessary setting adjustments are can also be seen here. Normally, your installer has already adjusted these settings.)

| Display | Description | Comments |
|---|--|--|
| <p>Settings for heat pump/electric heater necessary! Go to installer menu</p> <p>↓</p> | <p>▶ This display is only relevant before the installer has adjusted the settings in the installer menu.</p> | |
| <p>Electric boiler operation activated Actual power electric heater: 6.0 kW</p> <p>↓</p> | <p>▶ If your AquaPaQ is not equipped with a heat pump module, it runs automatically as an electric boiler. This display provides information about the electrical power that the electric heater is currently using.</p> | Only displayed if heat pump is not installed. |
| <p>**** SYSTEM OK **** Heat pump status: Standby Compressor blocked</p> <p>↓</p> | <p>▶ This screen is only shown if the compressor is blocked for some reason. Your installer should have "unlocked" this block during installation.</p> | Only displayed if heat pump module is installed |
| <p>**** SYSTEM OK **** Heat pump status: Standby No need for heat</p> <p>↓</p> | <p>▶ If the AquaPaQ has enough hot water in both the upper and lower tank sections, there is no need for the heat pump to run, which this display shows.</p> | |
| <p>**** SYSTEM OK **** Heat pump status: Standby Establish contact...</p> <p>↓</p> | <p>▶ This screen only appears during startup / voltage setting for the AquaPaQ and indicates that circuit boards for the tank and the heat pump module have started to communicate.</p> | |
| <p>**** SYSTEM OK **** Heat pump status: Standby Waiting for signal..</p> | <p>▶ This screen is displayed just before the heat pump starts. The heat pump module waits for confirmation from the tank section's circuit board before starting.</p> | |

| Display | Description | Comments |
|---|---|---|
| <pre> **** SYSTEM OK **** Heat pump status: Standby Tank temp too high </pre> | <p>▶ The heat pump cannot run if the water is too hot, and always checks just before starting to make sure the water in the tank sections is not too hot. The heat pump will automatically start again when the tank temperature has dropped.</p> | |
| <pre> **** SYSTEM OK **** Heat pump status: Start delay Time left:4min 38sec </pre> | <p>▶ Each time the heat pump module (the compressor) stops, at least 10 minutes must pass before it can be restarted. This screen is displayed each time the compressor has stopped, and shows how much of the time delay remains.</p> | |
| <pre> **** SYSTEM OK **** Heat pump status: Prerun charge pump.. Time left: 16 sec </pre> | <p>▶ Sixty seconds before the heat pump starts, the pump that is moving the water between the tank section and the heat pump module (charge pump) will start to check the temperatures in order to optimise operations during startup. This information appears in the display during that time.</p> | <p>Only displayed if heat pump module is installed</p> |
| <pre> **** SYSTEM OK **** Heat pump status: Charging lower tank In: 31.8C Out: 37.5C </pre> | <p>▶ When the heat pump module is running, it is charging either the upper or the lower tank section. The screen shows which tank section is being charged, as well as the temperature of the water going in/out of the heat pump module.</p> | |
| <pre> **** SYSTEM OK **** Heat pump status: Charging upper tank In: 31.8C Out: 37.5C </pre> | <p>▶ Same as above but for the upper tank section</p> | |
| <pre> **** SYSTEM OK **** Standby mode active Standby XXX Time:36min </pre> | <p>▶ This view will be present if the installer has installed external equipment, for example time relay, that block operation for electric heater and/or heat pump. XXX can be the following:</p> <ul style="list-style-type: none"> - <i>El. heater</i> - <i>El.h+heatp.</i> | <p>Only displayed if system set in standby by external device</p> |
| <pre> **** SYSTEM OK **** Upper tank: 52.3C Lower tank: 37.8C Heat system: 34.5C </pre> | <p>▶ This display is shown continuously during normal operation and provides information about the temperature of the AquaPaQ's two tank sections. It also displays the temperature of the water to be sent to your heating system, the so-called flow line.</p> | |

Errors

If an AquaPaQ unit receives an ERROR, none of the autogenerated screens discussed in the previous section are displayed, but the active alarms are displayed instead.

Error management

For all alarms, one or more, an overview display appears, providing information about how many alarms have been activated and information about the ones that are still active.

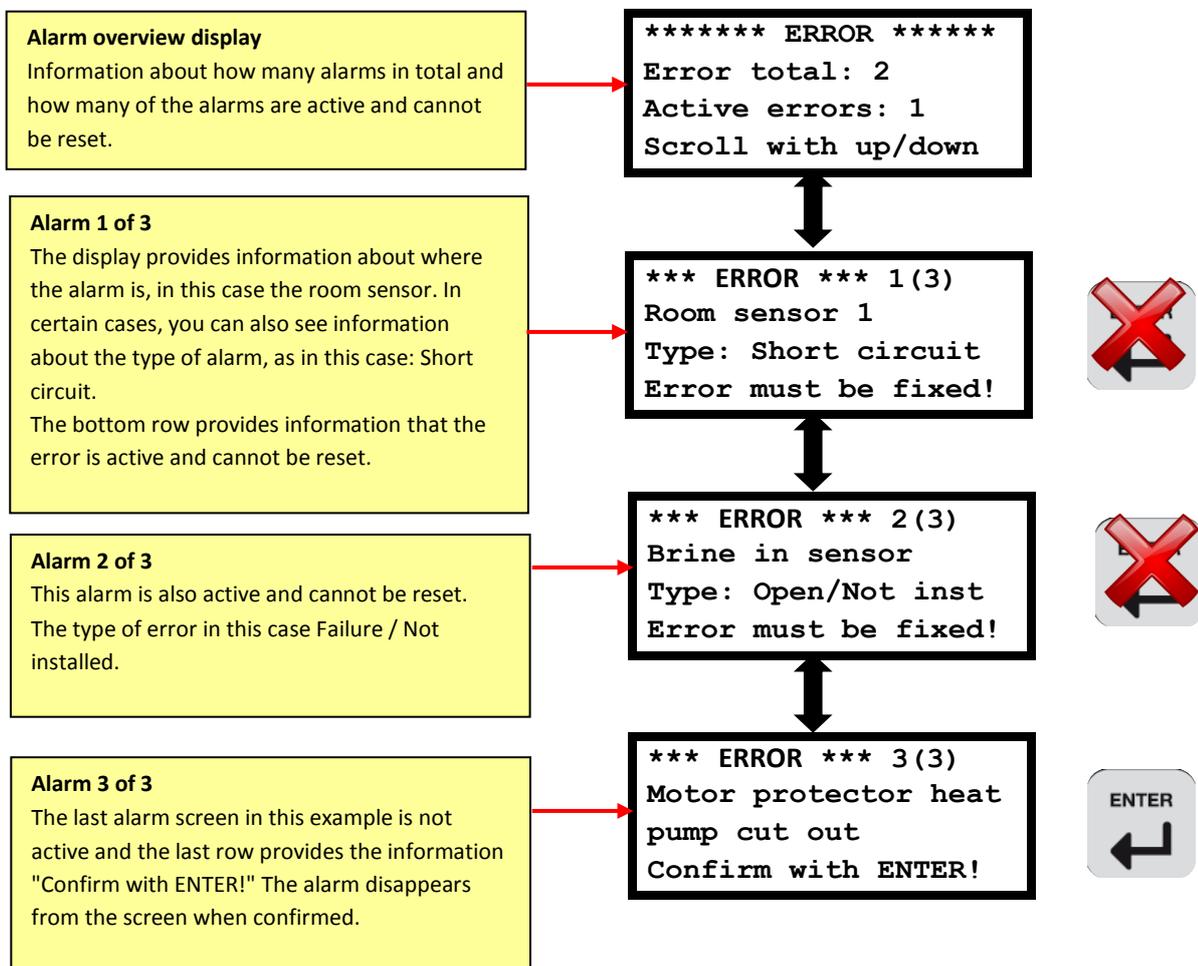
An alarm can be either active or inactive.

Active alarms cannot be reset before the cause of the error has been found and corrected. Inactive alarms can be reset by confirming them with the Enter button.

You can easily browse through the alarms with the up/down arrows.

(Note that if there are several inactive alarms, all of them are reset if you reset one of them.)

Example of alarm display where 3 alarms have been activated and 2 of the alarms are still active.



Alarm displays

The table below shows all the alarms that can be tripped in an AquaPaQ

| Display | Description | Comments |
|--|--|---|
| <pre>----- ERROR ----- No communication</pre> | <p>This error is not like any of the regular alarms, rather it is a self-generated alarm from the display. All the text will flash. The alarm is displayed if there is a communication failure between AquaPaQ's circuit board in the tank section and the circuit board for the display.</p> <p>Check the cabling between the tank's circuit board and the display.</p> | |
| <pre>*** ERROR *** 1(1) Brine in sensor Type: (See explanation) Error must be fixed!</pre> | <p>Error with the brine in the sensor located on a pipe in the heat pump module - see the overview diagram at the beginning of this manual.</p> <p>This type of error can be either a short circuit or a failure in the sensor or cable.</p> | Only displayed if heat pump module is installed |
| <pre>*** ERROR *** 1(1) Diff sensor radiator Type: (See explanation) Error must be fixed!</pre> | <p>Error on one of the differential sensors used to measure the amount of energy in your heating system.</p> <p>This type of error can be either a short circuit or a failure in the sensor or cable.</p> | Only displayed if the energy meter accessory is installed |
| <pre>*** ERROR *** 1(1) Diff sensor tap water Type: (See explanation) Error must be fixed!</pre> | <p>Error in one of the differential sensors used for measuring the amount of energy in your heating system.</p> <p>This type of error can be either a short circuit or a failure in the sensor or cable.</p> | Only displayed if the energy meter accessory is installed |
| <pre>*** ERROR *** 1(1) Brine out sensor Type: (See explanation) Error must be fixed!</pre> | <p>Error in brine out sensor located on a pipe in the heat pump module - see overview display at the beginning of this manual.</p> <p>This type of error can be either a short circuit or a failure in the sensor or cable.</p> | Only displayed if heat pump module is installed |
| <pre>*** ERROR *** 1(1) Pool temp sensor Type: (See explanation) Error must be fixed!</pre> | <p>Error in pool temperature sensor that ensures that the pool maintains the correct temperature.</p> <p>This type of error can be either a short circuit or a failure in the sensor or cable.</p> | Only displayed if a pool heater accessory is installed |
| <pre>*** ERROR *** 1(1) HWC water sensor Type: (See explanation) Error must be fixed!</pre> | <p>Error in hot water recirculation sensor that ensures that the hot water circulation is functioning as it should.</p> <p>This type of error can be either a short circuit or a failure in the sensor or cable.</p> | Only displayed if the hot water circulation sensor is installed |
| <pre>*** ERROR *** 1(1) FlowtempSen system 1 Type: (See explanation) Error must be fixed!</pre> | <p>Error in the hot water system's flow line temperature sensor, which ensures that the correct temperature is sent to the heating system.</p> <p>This type of error can be either a short circuit or a failure in the sensor or cable.</p> | |

| Display | Description | Comments |
|--|---|--|
| *** ERROR *** 1(1) Flowtempns system 2 Type: (See explanation) Error must be fixed! | Error in the secondary heating system's flow line temperature sensor, which ensures that the correct temperature is sent to the other heating system. This type of error can be either a short circuit or a failure in the sensor or cable. | Only displayed if the extra heating system accessory is installed |
| ↓ | | |
| *** ERROR *** 1(1) Flowtmp sensor HP Type: (See explanation) Error must be fixed! | Error in the heat pump's flow line temperature sensor located on a pipe in the heat pump module - see the overview diagram at the beginning of the manual. This type of error can be either a short circuit or a failure in the sensor or cable. | |
| ↓ | | |
| *** ERROR *** 1(1) Hot gas sensor Type: (See explanation) Error must be fixed! | Error in the heat pump's hot gas sensor located on a pipe in the heat pump module - see overview diagram at the beginning of this manual. This type of error can be either a short circuit or a failure in the sensor or cable. | Only displayed if heat pump module is installed |
| ↓ | | |
| *** ERROR *** 1(1) Outdoor sensor Type: (See explanation) Error must be fixed! | Error in the outdoor sensor used to calculate the heating curve. In the event of an error in the outdoor sensor, AquaPaQ sets the default value on the outdoor sensor to -5° C so that the heating curve does not "bolt". This type of error can be either a short circuit or a failure in the sensor or cable. | |
| ↓ | | |
| *** ERROR *** 1(1) Returnsen heat pump Type: (See explanation) Error must be fixed! | Error in the heat pump's return sensor located on a pipe in the heat pump module - see the overview diagram at the beginning of this manual. This type of error can be either a short circuit or a failure in the sensor or cable. | Only displayed if heat pump module is installed |
| ↓ | | |
| *** ERROR *** 1(1) Room sensor 1 Type: (See explanation) Error must be fixed! | Error in the room sensor used to adjust the heating curve, among other things. In the event of an error in the room sensor, AquaPaQ shuts off the ability of the room sensor to affect the heating curve. This type of error can be either a short circuit or a failure in the sensor or cable. | Only displayed if room sensors are installed and used to compensate the heating curve. |
| ↓ | | |
| *** ERROR *** 1(1) Room sensor 2 Type: (See explanation) Error must be fixed! | Error in the room sensor for the secondary heating system that is used to adjust the heating curve, among other things. In the event of an error in the room sensor, AquaPaQ shuts off the ability of the room sensor to affect the heating curve. This type of error can be either a short circuit or a failure in the sensor or cable. | Only displayed if the extra heating system accessory is installed and room sensors are used to compensate the heating curve. |
| ↓ | | |
| *** ERROR *** 1(1) Sun sensor Type: (See explanation) Error must be fixed! | Error in the sensor located in your solar panel system and used to control when energy should be sent from the panels to the AquaPaQ. This type of error can be either a short circuit or a failure in the sensor or cable. | Only displayed if the solar panel control accessory is installed |
| ↓ | | |
| *** ERROR *** 1(1) Tank sensor lower Type: (See explanation) Error must be fixed! | Error in the sensor in the lower section of the tank. This type of error can be either a short circuit or a failure in the sensor or cable. | |

| Display | Description | Comments |
|--|--|--|
| *** ERROR *** 1(1) Tank sensor upper Type: (See explanation) Error must be fixed! | <p>Error in the sensor in the lower section of the tank. This type of error can be either a short circuit or a failure in the sensor or cable.</p> | |
| <p style="text-align: center;">↓</p> *** ERROR *** 1(1) No communication with heat pump. Error must be fixed! | <p>Communication error between the circuit board in the heat pump module and the tank section's circuit board. Check the cabling between the module and the tank section.</p> | |
| <p style="text-align: center;">↓</p> *** ERROR *** 1(1) Motor protector heat pump cut out Error must be fixed! | <p>Power to the heat pump has become higher than normal. This can have various causes. Check that no main fuse has tripped.</p> | |
| <p style="text-align: center;">↓</p> *** ERROR *** 1(1) Wrong direction of Water pipes to HP Error must be fixed! | <p>This alarm may be due to the hoses from the heat pump module to the tank section being improperly connected or due to one of the water sensors on the heat pump showing an error.</p> | |
| <p style="text-align: center;">↓</p> *** ERROR *** 1(1) Phase L1 missing in heat pump Error must be fixed! | <p>This error occurs because one phase (L1) is missing for the heat pump module. Check the main fuses.</p> | <p>Only displayed if heat pump module is installed</p> |
| <p style="text-align: center;">↓</p> *** ERROR *** 1(1) High pressure switch Heat pump tripped Error must be fixed! | <p>Error occurs because the pressure in the heat pump module's compressor has become too high. Contact the service department in the event of repeated alarms.</p> | |
| <p style="text-align: center;">↓</p> *** ERROR *** 1(1) Hot gas temperature Heat pump too high Error must be fixed! | <p>This error occurs because the temperature in the heat pump's compressor has become too high. Contact the service department in the event of repeated alarms.</p> | |
| <p style="text-align: center;">↓</p> *** ERROR *** 1(1) Hot gas temperature heat pump too low Error must be fixed! | <p>This error occurs because the temperature in the heat pump's compressor is too low. Contact the service department in the event of repeated alarms.</p> | |
| <p style="text-align: center;">↓</p> *** ERROR *** 1(1) Tempdiff above heat pump low Error must be fixed! | <p>The alarm indicates that the temperature increase in the heat pump is low in relation to the flow that is running through the heat pump module. Contact the service department in the event of repeated alarms.</p> | |

| Display | Description | Comments |
|---|---|---|
| <p>*** ERROR *** 1(1) Low pressure switch heat pump cut out Error must be fixed!</p> | <p>▶ This error occurs if the pressure in the heat pump's compressor becomes too low. This can be caused by problems with air in the brine system or a defective circulation pump on the brine side, etc. Contact the service department in the event of repeated alarms.</p> | |
| ↓ | | |
| <p>*** ERROR *** 1(1) 12VDC supply to heat pump low/high Error must be fixed!</p> | <p>▶ This error occurs because the low-voltage supply to the heat pump's circuit board is outside the range. Contact the service department in the event of repeated alarms.</p> | |
| ↓ | | |
| <p>*** ERROR *** 1(1) 5VDC supply to heat pump low/high Error must be fixed!</p> | <p>▶ This error occurs because the low-voltage supply for the heat pump module is outside the range. Contact the service department in the event of repeated alarms.</p> | |
| ↓ | | |
| <p>*** ERROR *** 1(1) Temp of brine fluid too low. Error must be fixed!</p> | <p>▶ This error occurs because the temperature of the brine fluid has become too low. Your installer has set the lowest allowable temperature depending on how much anti-freeze was used. Contact the service department in the event of repeated alarms.</p> | |
| ↓ | | |
| <p>*** ERROR *** 1(1) Low flow brine- circuit. Error must be fixed!</p> | <p>▶ This alarm is tripped if the difference between the brine going into the heat pump and out of it is too large, which suggests that the flow is too weak. This can occur after installation if all the air has not been removed from the brine system. Contact the service department in the event of repeated alarms.</p> | <p>Only displayed if the heat pump is installed</p> |
| ↓ | | |
| <p>*** ERROR *** 1(1) Low charging flow heat pump Error must be fixed!</p> | <p>▶ This alarm may be caused by something blocking the flow through the heat pump module. If any type of dirt filter is mounted, this should be cleaned.</p> | |
| ↓ | | |
| <p>*** ERROR *** 1(1) Repeated stops on max tmp heat pump Error must be fixed!</p> | <p>▶ The alarm is shown if the heat pump module has stopped at its maximum temperature at least 5 times within one hour. The parameters may need to be adjusted. Contact your installer.</p> | |
| ↓ | | |
| <p>*** ERROR *** 1(1) Phase L2 missing in heat pump Error must be fixed!</p> | <p>▶ This error occurs because a phase (L2) is missing from the heat pump module. Check the main fuses.</p> | |

Installation

This chapter is intended for installers of the heating system.

► **Note that a commissioning report must be filled in after completing the installation**

Placement / Moving

Place the AquaPaQ indoors in a location with a solid foundation, preferably on a concrete floor. In order to prevent unnecessary noise, if possible, position the heat pump with its back against an exterior wall.

- If possible, avoid placing the unit close to bedrooms or other areas that are sensitive to noise.

The heat pump module can be easily removed from the tank section in order to lift/transport the product in 2 parts.

AquaPaQ has 4 adjustable legs that can be used to balance the tank unit.

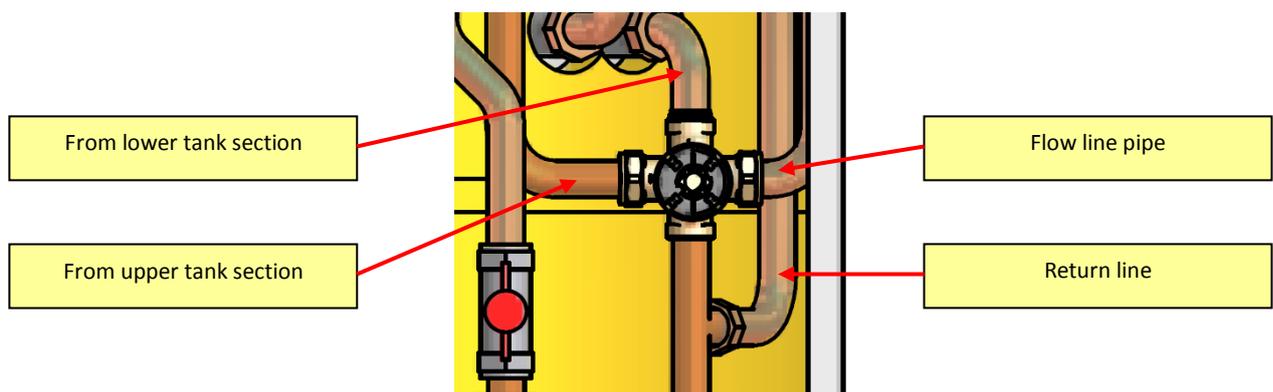
Pipes to heating system

In the basic design, heating pipes are mounted for a top connection. However, both pipes can be easily reversed to allow for a bottom connection.

The flow line for the heating system is mounted directly on the mixing valve using the clamp coupling. Before removing this pipe, be sure that the flow line sensor has not been knocked loose. Remove the sensor that is attached with a bulb strap before removing the pipe.

The return line for the heating system is mounted on a T connector piece below the mixing valve with gasket-equipped cap nuts. Remove the pipe by removing the coupling. Be careful to install the gasket before reinstalling the pipe.

The radiator pump should ideally be installed on the flow line pipe for the heating system.



Tap water pipe

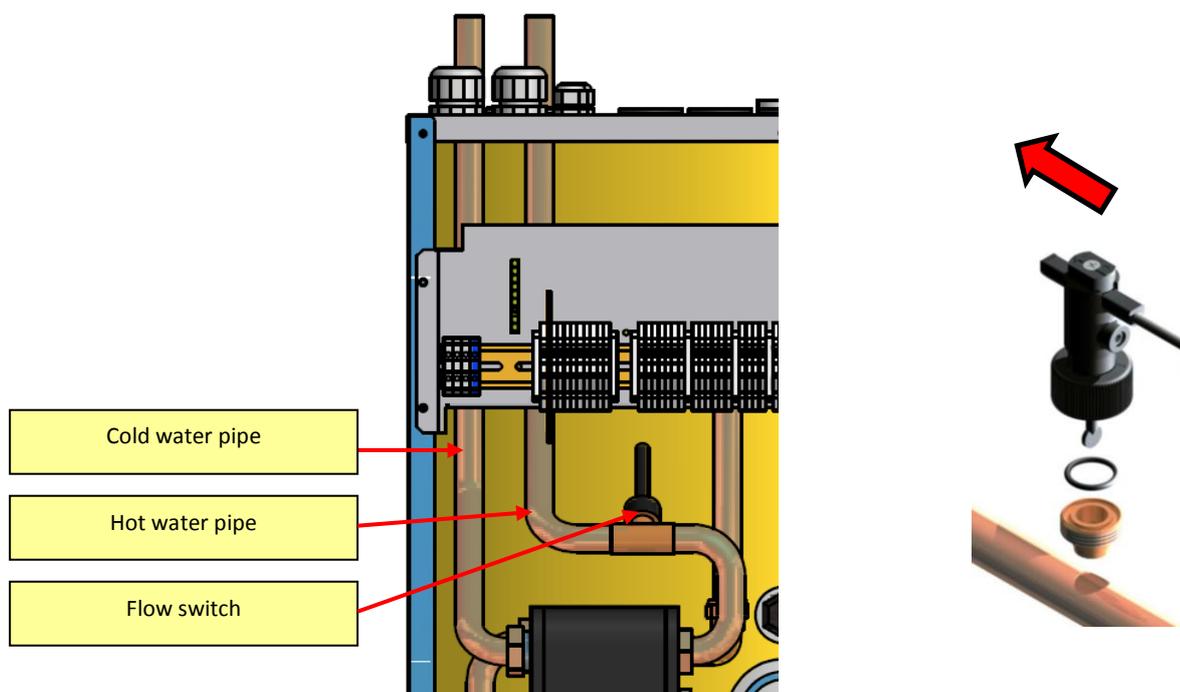
In the basic design, the tap water pipes cannot be angled for bottom assembly without a complete rebuild. As an alternative, customised drain water pipes for a bottom connection can be ordered.

Connection pipe bottom installation tap pipe, item no. 97774707001

The flow switch must be removed for a bottom installation. It is very important to check the direction of flow when reinstalling the switch. An arrow shows the correct flow direction - see diagram below.

The connection pipes for tap water are designed with a cc measurement of 55 mm in order to make installing a combination of valves easy.

Note that the safety valve does not need to be installed as the exchanger volume is below 1 litre.



Hot water circulation

AquaPaQ has controls that can be easily connected to a hot water circulation system. This system requires an accessory package that can be ordered from mecaterm and includes a hot water circulation sensor and footings. Connecting a hot water circulation system directly to the boiler is not recommended without this accessory kit.

Alternatively, a smaller, external hot water heater can be used for connecting a hot water circulation system.

Brine medium

Dimensioning

The collector for earth / bedrock / groundwater / lake heat, etc. should be dimensioned according to a computerised calculation program. Mecaterm has a dimensioning program and can assist with this type of calculation.

Connection hoses

Brine medium hoses for the brine system are already installed at the factory and can be removed from the tank on the right or left side.

The side plates are perforated at the outlets. Use pliers or a similar tool to cut off the metal blanks on the desired side. Be careful because this can create sharp edges.

The brine hoses are marked with the text "Brine in" and "Brine out" with arrows showing the flow.

Condensation insulation

Since the brine system can become colder than 0°C, all pipes/connectors must be insulated to prevent ice or condensation from forming.

Brine fluid

The brine medium should contain an antifreeze medium, e.g. propylene glycol, to maintain fluidity down to temperatures of -15°C.

Collector hose

The collector hose, PEM 40 x 2.4 PN 6.3, is used as standard. Every metre of hosing holds about 1 litre of fluid.

Aerating

The earth heat collector should be installed in a manner that facilitates self-aerating without any air pockets. If this is not possible, aerating valves will have to be fitted to the highest points in the collector. The level tank should be located at the highest point.

Fill coupling

Pre-fabricated couplings, e.g. LK 520 Multifill 25, with integrated valves / dirt filters, are recommended for quick installation in insulated houses.

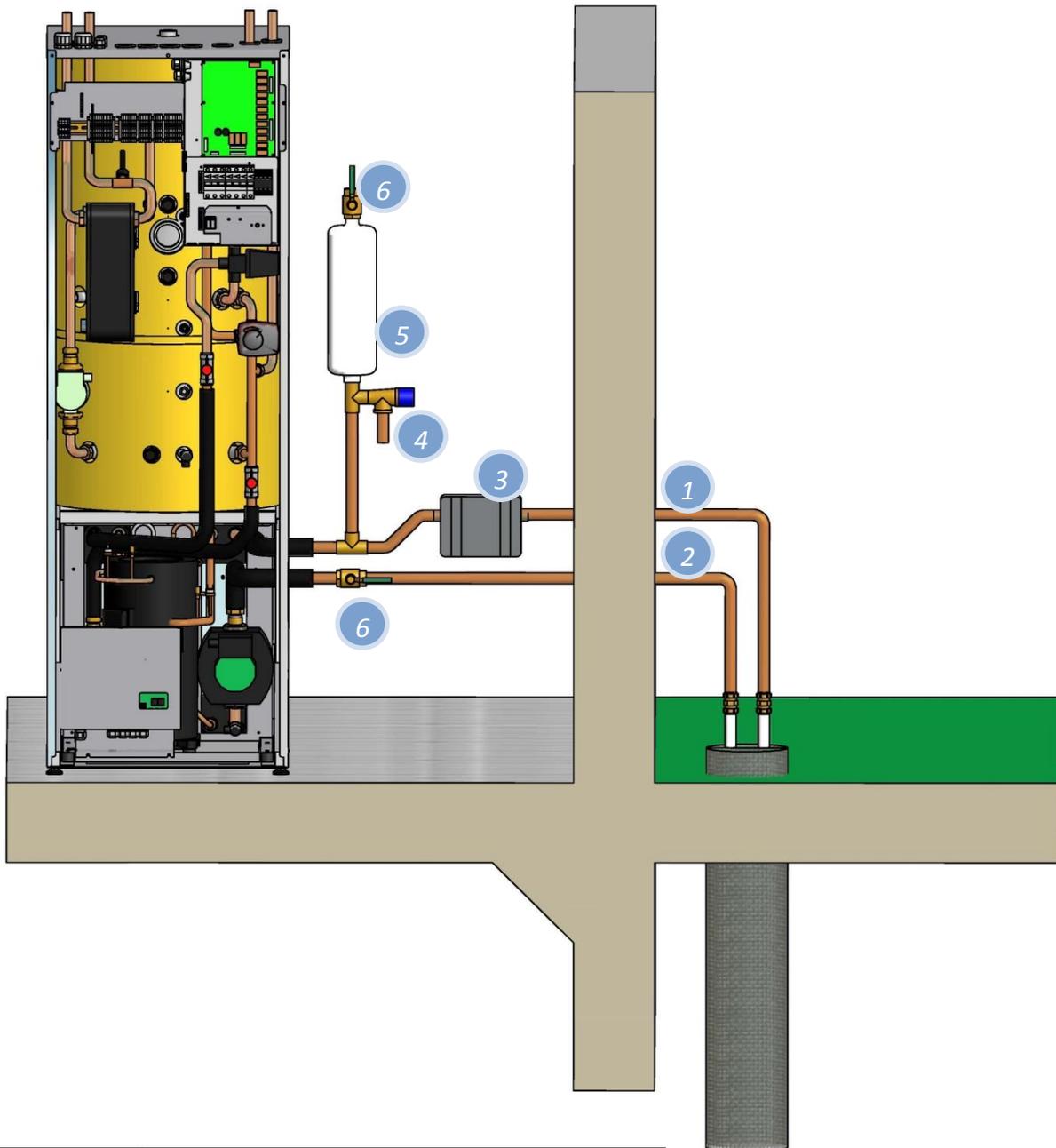
Expansion vessel

The expansion vessel or level tank should be installed as high as possible on the incoming brine pipe (brine in).

Safety valve

A safety valve with opening pressure of max 3 bar should be installed.

Schematic connection diagram for brine medium



| No. | Description |
|-----|---|
| 1 | Brine to heat pump (in) |
| 2 | Brine from heat pump (out) |
| 3 | Fill coupling (including valves, dirt filter) |
| 4 | Safety valve |
| 5 | Expansion vessel |
| 6 | Shutoff valve |

Brine medium pump

A brine medium pump is installed in the heat pump module and has 3 fixed speeds. Different flows are achieved depending on the overall drop in pressure in the brine medium system.

A maximum temperature difference of 3 °C between the brine in/out is the ideal. If the difference is too high, the system will issue a low brine flow alarm.

The diagram below shows the drop in pressure for the evaporator and the pump curve for the various models.

Diagram 1. Pressure drop in the evaporator with 30% ethylene glycol in the brine medium.

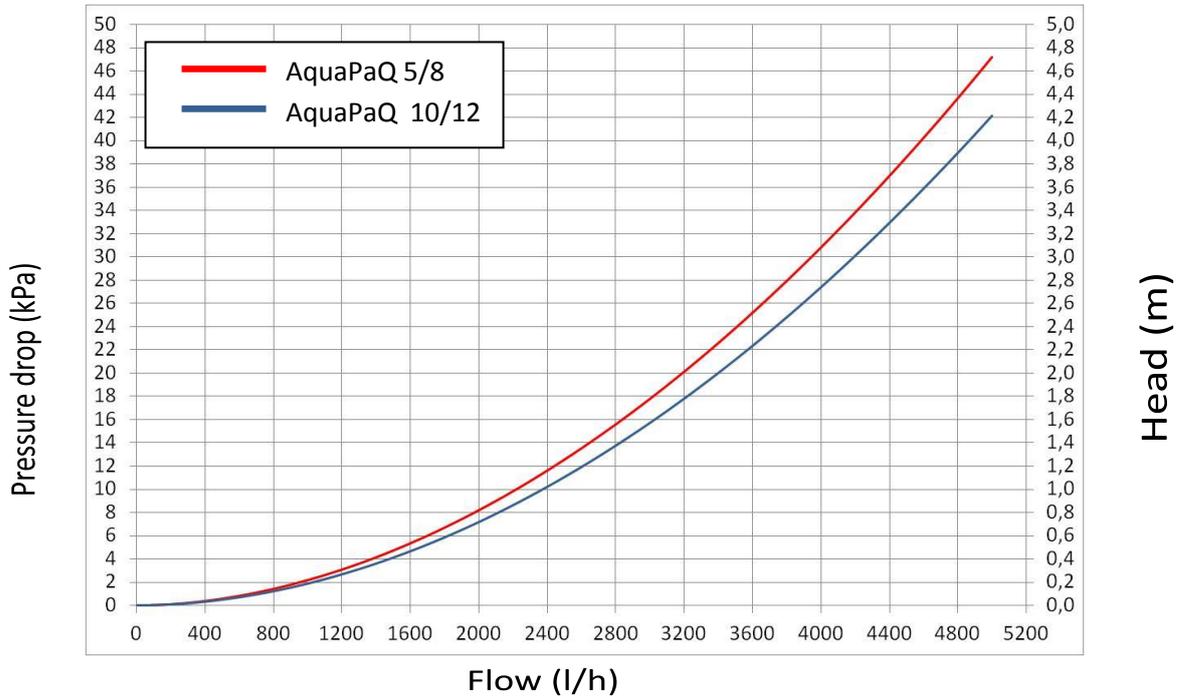


Diagram 2. Pump curve AquaPaQ 5/8

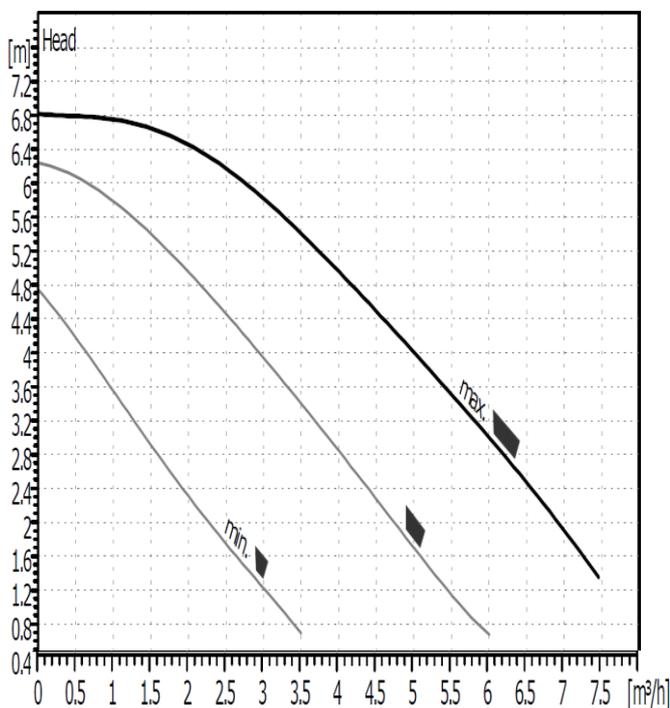
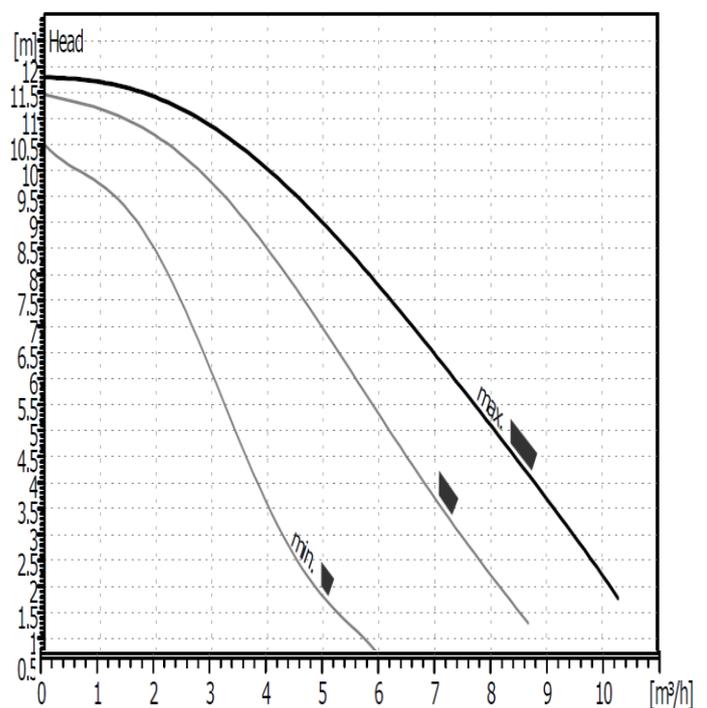


Diagram 3. Pump curve AquaPaQ 10/12



Power supply

The power supply to the AquaPaQ is connected on the power supply terminals up and to the left of the connecting plate. Check the phase sequence before connecting.

Based on the maximum power requirements for the system, select the correct fuse and cable dimensions.

Max fuse for the product is 32A.

The electric heater can be blocked in stages of 1.5 kW in order to limit the maximum connected power. Installing the accompanying current transformers is recommended, which provides automatic control of the maximum power based on a main fuse in the system.

The table below provides a rough guide to power usage with different electric heater stages connected to the heat pump.

Note that the element in the electric heater is 230 V, and if current transformers are installed the least loaded phase will be selected.

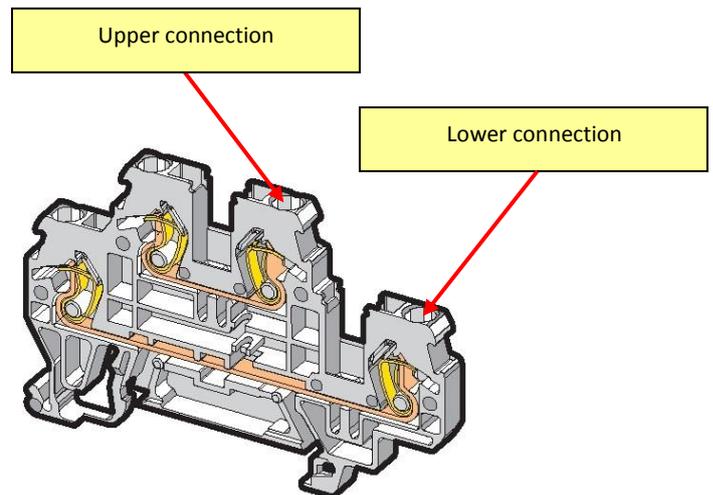
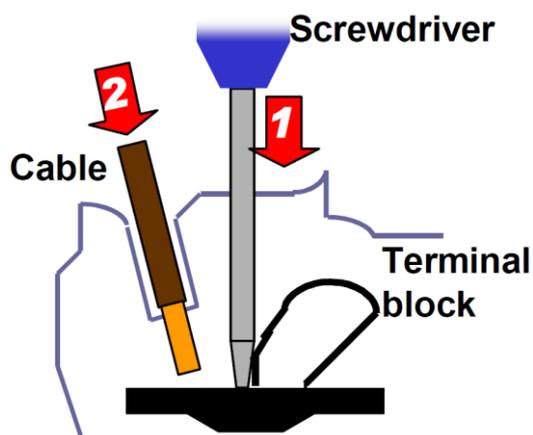
Table 1. Power usage by heat pump at different power settings for the electric heater.

| Power electric heater | 6.0 kW | | | 7.5 kW | | | 9.0 kW | | | 10.5 kW | | |
|----------------------------|--------|----|----|--------|-------|----|--------|-------|----|---------|----|----|
| | L1 | L2 | L3 | L1 | L2 | L3 | L1 | L2 | L3 | L1 | L2 | L3 |
| Without a heat pump module | 9.2A | | | 15.7A | 9.2A | | 15.7A | 9.2A | | 15.7A | | |
| AquaPaQ 5 | 13.5A | | | 20.0A | 13.5A | | 20.0A | 13.5A | | 20.0A | | |
| AquaPaQ 8 | 14.4A | | | 20.9A | 14.4A | | 20.9A | 14.4A | | 20.9A | | |
| AquaPaQ 10 | 15.9A | | | 22.4A | 15.9A | | 22.4A | 15.9A | | 22.4A | | |
| AquaPaQ 12 | 16.9A | | | 23.4A | 16.9A | | 23.4A | 16.9A | | 23.4A | | |

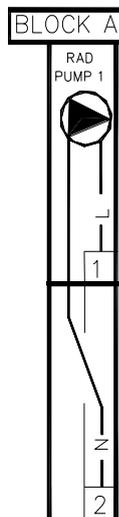
Terminal blocks

The terminal blocks are divided between 2 levels with a spring-loaded connection. Installation is easy by unloading the spring with a small screwdriver, pushing in the stripped cable and pulling out the screwdriver again. Check that the installation is correct by pulling hard on the cable. See also the diagrams below.

Also note the marking on the adhesive sticker regarding the upper and lower connection.

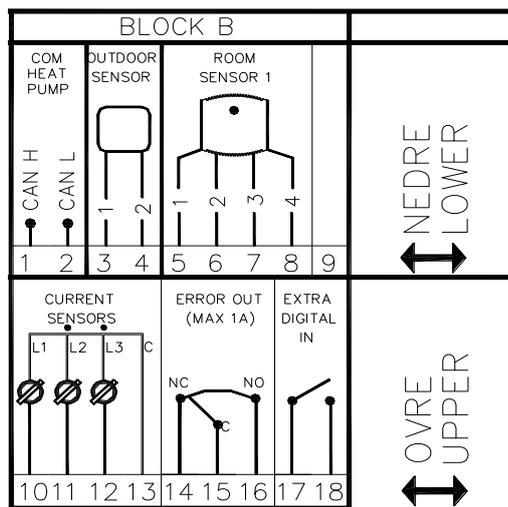


Block A – 230V



The only high voltage connection to be made apart from the power supply is connecting the radiator pump on block A. Use one of the cable fittings at the top for cable penetration. The earth wire is connected directly to the earth block.

Block B – extra-low voltage



Block B contains all of the low-voltage connections that are included as standard with the AquaPaQ. Some of the connections do not need to be connected for the product to work.

Communication 1-2

The connection is named "COM HEAT PUMP" on the adhesive sticker.

This connection is only used for mecaterm's air/water heat pumps and should not be connected.

Outdoor sensors 3-4

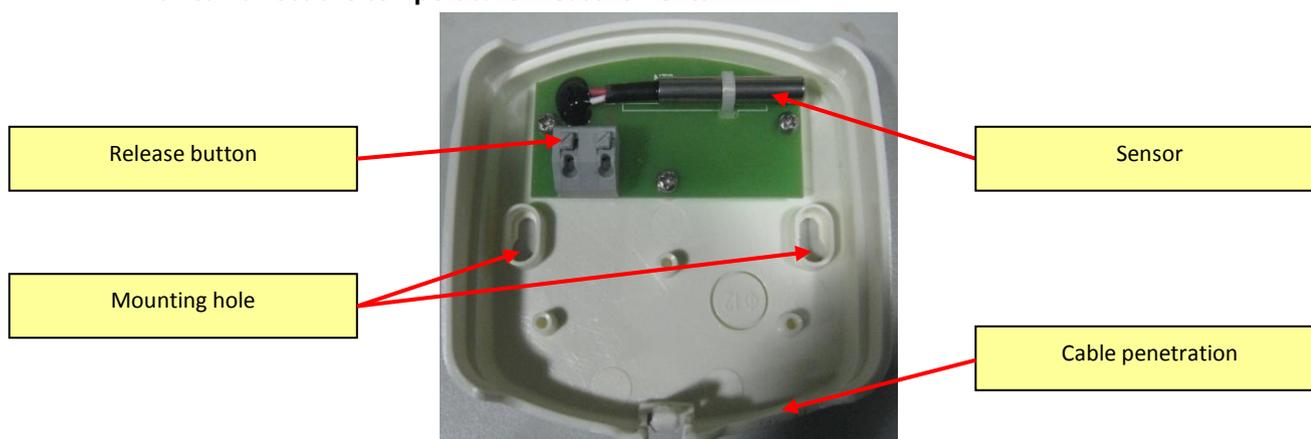
The connection is named "OUTDOOR SENSOR" on the adhesive sticker.

The outdoor sensor has a catch to be opened; tools are not needed. Two spring-loaded terminal blocks are located inside the sensor. Press the release button and insert the stripped cable to make the connection.

Cable to the outdoor sensor should be drawn with a minimum cable area of 0.5 mm² and is best mounted on the north or south side of the house so that it is not exposed to the morning sun.

The sensor should be placed at about 2/3 of the height of the house's facade and should be mounted to avoid direct sunlight.

Make sure that the sensor is not affected by ventilation ducts, doors, windows or similar fixtures which can affect the temperature measurements.



Room sensors 5-8

The connection is named "ROOM SENSOR 1" on the adhesive sticker.

The primary job of the room sensor is to transmit information about the room temperature in order to adjust the set house heating curve. This brings overall cost savings because the temperature of the water in the heating system never gets too high.

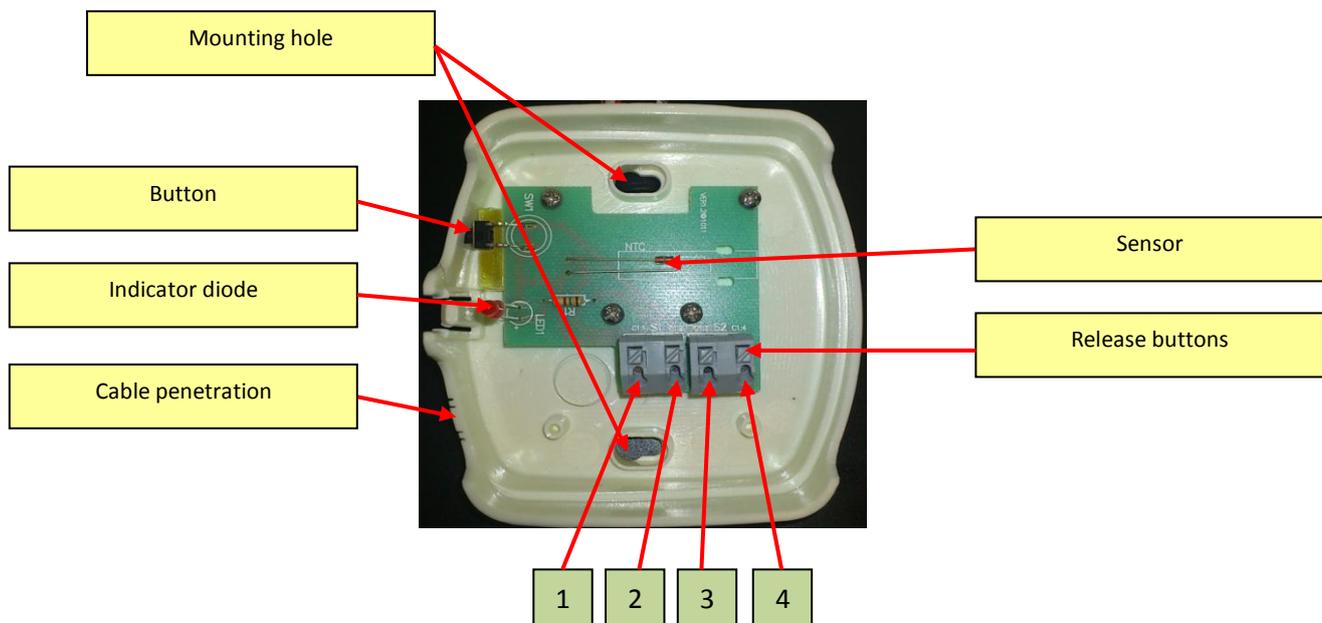
You do not need to use the room sensor function. (It can be turned off in the installer's menu in the display.) However, it is always recommended to install the room sensor because it also includes an alarm diode that flashes if something is wrong. In addition, there is a button on the room sensor that can be used for different functions, e.g. extra hot water, which can be set in the display.

In order for the room sensor to work well, the sensor should be placed in as central and open a location as possible in the house.

Do not place it by windows, radiators or similar fixtures.

Mount the sensor about 2/3 of the way up the wall, and it is best installed in such a way that it is possible to reposition it.

The room sensor terminals are marked (1-4) and should be connected according to the figure below. The tank section's adhesive sticker is also marked with connection numbers 1-4. Connect the same numbers for the room sensors as for the boiler.



Current transformers 10-13

The connection is named "CURRENT SENSORS" on the adhesive sticker.

Current transformers are included as standard. The job of the current transformers is to continuously measure the current on the incoming phases in the house/system. This measuring helps the program ensure that the power never exceeds the rating for the main fuse by releasing any power-stage in the electric heater.

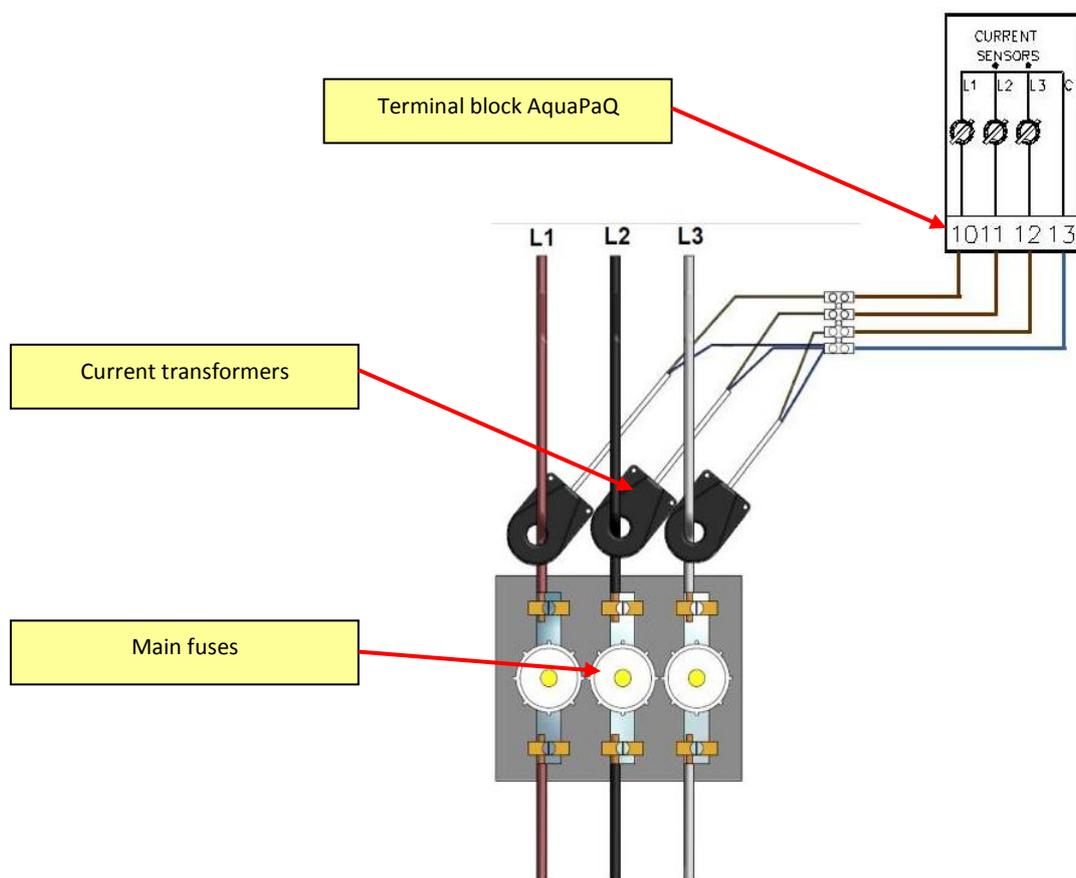
The current transformers are phase selective, i.e. they measure each phase separately. This allows the system to decide itself which phase to load. This also ensures that the 3 phases are distributed as evenly as possible.

Installing the current transformers is recommended but not required. It is possible to limit the maximum electrical power for the electric heater in the display.

The current transformers should be installed on the incoming feed to the central control unit, which must be protected against overloads. This should only be performed by an authorised electrician.

The minimum cable area for the connection is 0.5 mm². At least 4-lines must be used.

Mount the transformers by threading the incoming phases through the transformer. The blue cables from the transformers should be joined together and connected to the common terminal block 13



Error out 14-16

The connection is named "ERROR OUT (MAX 1A)" on the adhesive sticker.

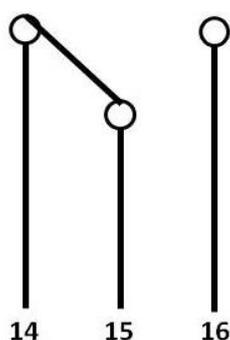
The output is potential-free and has both an NC and an NO connection. It can be used to get a signal to an external unit or to a GSM unit.

The output can be loaded with max 1A

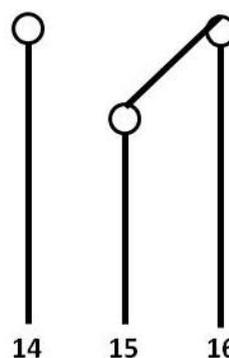
During normal operations with no alarm, there is contact between terminals 15 and 16.

In the event of an alarm or power failure there is contact between 14 and 15

Error or power failure (NC)



Normal operations (NO)



Digital input 17-18

Connection named "EXTRA DIGITAL IN" on the adhesive sticker.

The input should be potential-free and has different functions depending on what settings are chosen in the display. From program version 1,4 the set function is standby. In installers menu it's possible to set what device that should be set to standby when the input is closed. Following choices are possible:

- *Electric heater*
- *Heat pump*
- *Electric heater and heat pump*

Mixing valve function (house heating) is not affected by this function

First commissioning

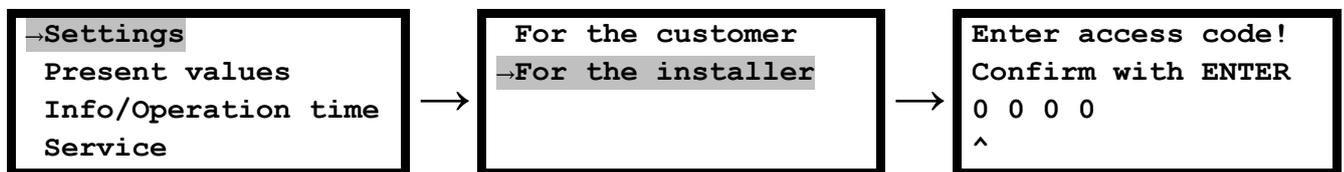
During the initial commissioning, a number of selections must be made in order for the system to start. The first thing that appears during commissioning is the following display. (If you want to learn more about how to use the buttons to navigate, see the chapter "Handling").

```
Choose language...  
Confirm with ENTER  
>>>SWEDISH<<<
```

You can change the language using the up/down arrows. Confirm the selected language with the ENTER button.

After selecting the language, you will come to menu where you can adjust the settings.

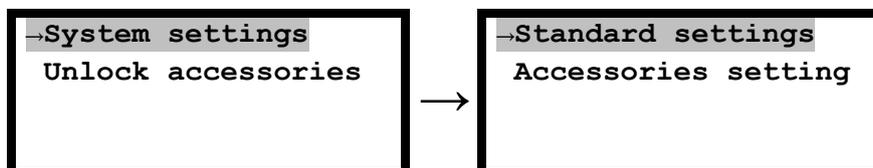
Use the arrow buttons to move to the following location:



Enter access code: **3550**

You are now in the installer menu.

Proceed to the standard settings by selecting the following:



The subsequent pages describe the settings that must be entered so that the system can start.

System settings

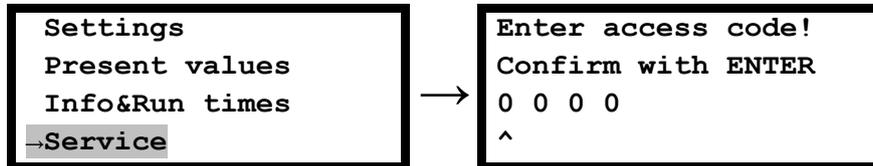
| Display | Description | Comments |
|---|---|---|
| <p>Heat pump found... Model: Aqua 8 S/N: 2535645495 Installed: →No</p> | <p>The display provides information on which heat pump module is installed and its serial number. AquaPaQ can be run without a heating pump as purely and electrical boiler with an integrated electric heater. In order to activate the heat pump module, select installed: yes</p> | <p>Only displayed if heat pump module is found</p> |
| <p>Compressor blocking Compressor is: →Blocked</p> | <p>The compressor is blocked by default in order to prevent the system from unintentionally starting before the installation is finished. Do not remove the blocking before the installation is completely finished and there are no problems prior to starting.</p> | <p>Only displayed if heat pump module is installed</p> |
| <p>(Only valid for MasterQal 500) Extra electric heater installed:→No</p> | <p>No function for AquaPaQ. The setting should be set at "No"</p> | |
| <p>Electric heater is: Blocked Max allowed power →0.0 kW</p> | <p>Electric heater is blocked by default. When activating the power stage, the blocking is automatically removed. Max power can be set in 6 steps from 1.5 kW to 10.5 kW. (If current transformers are installed, the max power is controlled automatically and the allowable power can be set to 10.5 kW.)</p> | |
| <p>Delayed start of electric heater Delay: →0 min</p> | <p>This setting makes it possible to delay starting the electric heater even if the base conditions (temperature hysteresis) for startup are fulfilled. A delay gives the heat pump a longer time to try to meet the need. In the event of an alarm, excessive temperature on the heat pump, or when the compressor is blocked, the time delay is lifted automatically.</p> | <p>Only displayed if heat pump module is installed</p> |
| <p>Current sensors are installed: →No</p> | <p>Select if current transformers are installed or not. Installing the current transformers is recommended.</p> | |
| <p>Main fuze size (Fuse that should be protected by current sensors) →16A</p> | <p>Setting for main fuse or protector so that the central control unit is protected from overcurrent.</p> | <p>Only displayed if the current sensor is installed.</p> |
| <p>Auto run brine circ pump during 48h →Off Time left: 0h 0min</p> | <p>Before unlocking the compressor block the brine circuit should be checked to confirm that there is a flow. This menu enables the possibility to run the brine circulation pump independent of the compressor. Enabling of this function also helps when venting out air from the brine circuit.</p> | <p>Only displayed if heat pump module is found</p> |

| Display | Description | Comments |
|--|---|--|
| <p>Only floor heating used in standard heating system (1): →No</p> | <p>Option to set the system for running underfloor heat only. If this is option is set to Yes, several settings in the "House heating curve" menu are activated and allow you to set the max flow to the underfloor system.</p> | |
| <p>↓</p> <p>Choice for standby function, (block nr 17/18 Block B) →Not used</p> | <p>This setting make it possible to choose what devices that should be set to standby mode if digital input 17/18 on the connection terminal is closed. Following choices are present:</p> <ul style="list-style-type: none"> - Standby electric heater - Standby heat pump - Standby electric heater and heat pump | |
| <p>↓</p> <p>Delay heat on/off when outdoor temp around heat curve Point C: →4h</p> | <p>This setting makes it possible to set a time delay to prevent jumping between heating on/off. When outdoor temperature increases above the temperature set in point C the time delay starts. After the set time heating goes to off. The same is true if heat is off and the outdoor temperature decreases below point C. Heating will not start until the time delay has finished.</p> | |
| <p>↓</p> <p>Delay mixing valve to open for upper tank part (system 1) Delay time: →180 min</p> | <p>The bivalent mixing valve can collect energy from both the upper and lower sections of the tank. The cheapest energy is in lower temperature water in the lower tank section and is prioritised in order to achieve the most cost efficient operations. When the mixing is in the middle position between the upper and lower tank sections, a limit position is activated. Based on the time that is set in this menu, the mixing is not allowed to open until this time has passed, and the heat pump is then allowed to go up to the temperature in the lower tank section. If the heat pump is not installed, the mixing opening is not delayed.</p> | <p>Only displayed if heat pump module is installed</p> |
| <p>Flow reduce valve is mounted: →Yes (Don't mount for HP ArQ16/EVI14/Aqua17)</p> | <p>From 2013-06 all AquaPaQs will have a special flow reduce valve mounted in the hose from the heat pump unit. If this valve is mounted a sticker will be place on the mentioned hose. If no sticker is found the setting in the display must be "No". Default setting is "Yes"</p> | <p>Only displayed if heat pump is installed</p> |
| <p>↓</p> <p>Language →ENGLISH</p> | <p>Setting the language for the display screen</p> | |
| <p>↓</p> <p>** Factory reset ** WARNING! ALL SETTINGS WILL BE LOST Reset: →No</p> | <p>This menu is used to reset all of the settings to the factory default settings. Note that you cannot reverse the reset. If the selection is activated, the text "Factory default setting completed!" appears.</p> | |
| <p>↓</p> <p>Reset operation time WARNING! ALL LOGGED OP TIMES WILL VANISH Reset: →No</p> | <p>This menu is used to zero set all of the run times in the system. Note that you cannot reverse the zero setting. If the selection is activated, the text "Run times zero set!" will appear.</p> | |

Service

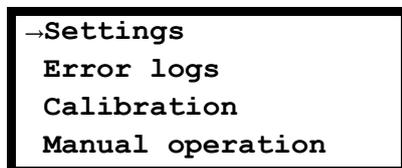
The last item in the main menu is the "Service" option. This menu includes more advanced settings as well as options for test runs and calibrating the sensors. This menu is used primarily by service technicians and should not be used unless you have a thorough knowledge of the system.

Use the arrow buttons to move to the following location:



Enter access code: **7902**

You are now in the service menu.



Settings

This menu is only accessible if the heat pump module is installed.

| Display | Description | Comments |
|--|--|----------|
| Restart diff for heat pump in lower tank part: -5.0C | Setting for restarting hysteresis for the lower tank section. | |
| Restart diff for heat pump in upper tank part: -5.0C | Setting for restarting hysteresis for upper tank section. | |
| Low charge flow alarm if temp diff above: -35C | Setting for the alarm that the charging flow through the heat pump is too low, i.e. the temperature differential is too large. (The setting applies when the charge pump is running at maximum speed, i.e. 100%.) | |
| Freeze alarm activates if brine out temp below: -10C | Setting for brine medium freezing risk. If the brine medium from the heat pump (brine out) reaches the set value, the heat pump will stop and an error code will appear. | |
| Low brine flow alarm when temp diff above: -8C | Alarm setting for low brine flow through the heat pump module, i.e. the temperature differential is too large. | |
| Max flow temperature from heat pump: -58C | Max allowed flow temperature from heat pump | |
| Max tempdiff between max set flow temp and return temp for start: Diff:-8C | Before start of the heat pump module the charge pump will run at a low flow during 1min in order to measure the water temperature. If the temperature on the return water is warmer than the max set flow temperature – this difference the heat pump module will not start. Example: Max set flow temperature=60C. Max tempdiff=8C Max return temp for start=60C-8C=52C | |
| Charge difference between heat pump and nominal value in upper tank: -2,5C | When charging upper tank part the target temperature for the heat pump will be the nominal value + the set value in this menu. I.e. if nominal value for upper tank is 53C and the charge difference is set to 2,5C the target temperature for the heat pump will be 55,5C | |

| Display | Description | Comments |
|---|--|----------|
| PI regulator charge pump PGain: 3000 | <p>Note that the settings in the remaining displays should not be adjusted before contacting mecaterm.</p> <p>(The charge pump that moves the water through the heat pump module is controlled with a PI regulator to achieve the correct temperature under different conditions. The regulator control can be adjusted by changing a number of settings.)</p> | |
| ↓ PI regulator charge pump IGain: 400 | | |
| ↓ PI regulator charge pump Integral time: 15 sec | | |
| ↓ PI regulator charge pump Integral max: 5000 | | |
| ↓ PI regulator charge pump Integral min: -5000 | | |
| ↓ PI regulator charge pump Min flow: 190 l/h | | |

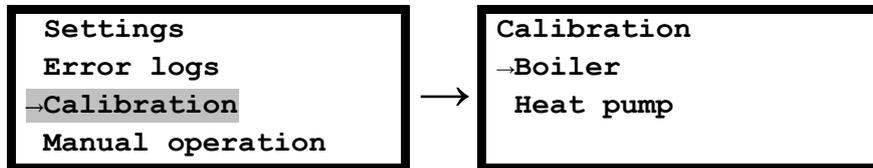
Error log

The error log selection displays the past 5 alarms with information about the cause of the alarm and the existing operating data when the alarm was tripped. This allows service technicians to draw conclusions about the cause of the alarm.

| Display | Description | Comments |
|---|---|----------|
| <div style="border: 2px solid black; padding: 5px;"> <p>1 (5) High pressure A: 62C B: 53C C: 15.2A D: -12C E: -14C F: 115C G: -16C H: 99% I: 12501</p> </div> <p style="text-align: center;">↓</p> | <p>The number 1 in "1(5)" indicates which display is shown. 1(5) is the last alarm that was logged. The letters A-I have the following meanings according to the table below.</p> <p>A: Flow temperature from the heat pump module</p> <p>B: Return temperature to heat pump module</p> <p>C: Power consumption compressor</p> <p>D: Brine temperature to heat pump module</p> <p>E: Brine temperature from heat pump module</p> <p>F: Hot gas temperature</p> <p>G: Outdoor temperature</p> <p>H: Charge pump speed</p> <p>I: Estimated flow charge pump</p> | |

Calibration

The calibration menu is used to adjust the value on the sensor up or down. Note that calibration should only be performed with a calibrated temperature instrument. When you enter the calibration menu, a submenu appears where you can choose to calibrate the boiler or the heat pump sensor. All of the calibration displays show the sensor's current values as well as the current offset, i.e. how much the sensor is adjusted and in which direction. The default offset value is always 0.0°C



Calibration - Boiler

| Display | Description | Comments |
|---|-------------|--|
| <div style="border: 1px solid black; padding: 5px;"> Tank sensor lower Actual: 34.6C Offset: →+0.0C </div> | ▶ | Calibrating the lower tank sensor |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Tank sensor upper Actual: 54.6C Offset: →+0.0C </div> | ▶ | Calibrating the upper tank sensor |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Flow temp sensor Heat system (1) Actual: 40.3 Offset: →+0.0C </div> | ▶ | Calibrating flow line temperature sensor (to heating system 1) |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Room sensor (1) Actual: 20.1C Offset: →+0.0C </div> | ▶ | Calibrating room sensor (to heating system 1) |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Outdoor sensor Actual: -10.1C Offset: →+0.0C </div> | ▶ | Calibrating outdoor sensor |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Current sensor L1 Actual: 12.2A Offset: →+0.0A </div> | | Calibrating current sensor L1 |

| Display | Description | Comments |
|---|---------------------------------|----------|
| Current sensor L2 Actual: 12.4A Offset: →+0.0A | ▶ Calibrating current sensor L2 | |
| ↓ | | |
| Current sensor L3 Actual: 12.4A Offset: →+0.0A | ▶ Calibrating current sensor L3 | |

Calibration - Heat pump

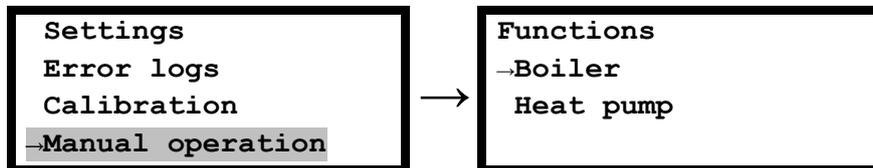
| Display | Description | Comments |
|--|---|----------|
| Primary flow temp sensor Actual: 44.6C Offset: →+0.0C | ▶ Calibrating primary flow temp sensor | |
| ↓ | | |
| Return flow temp sensor Actual: 30.6C Offset: →+0.0C | ▶ Calibrating flow temp sensor | |
| ↓ | | |
| Hot gas sensor Actual: 94.3C Offset: →+0.0C | ▶ Calibrating hot gas sensor | |
| ↓ | | |
| Sensor brine in Actual: -2.1C Offset: →+0.0C | ▶ Calibrating brine in sensor | |
| ↓ | | |
| Brine out sensor Actual: -4.4C Offset: →+0.0C | ▶ Calibrating brine out sensor | |
| ↓ | | |
| Current sensor L1 Actual: 6.6A Offset: →+0.0A | ▶ Calibrating current sensor for compressor power | |

Manual operation

The manual operation menu is used to manually run all of the components separately. This menu can be used to check that the installation is correct and for troubleshooting.

When you enter this menu, a submenu appears where you can test the heat pump functions as well as the boiler.

Note that when you enter this menu, all of the components are shut off, and the status light starts to flash red and green.



Manual operation - Boiler

| Display | Description | Comments |
|--|---|----------|
| <div style="border: 1px solid black; padding: 5px;"> Radiator pump (Heating system 1) →Off On </div> | <div style="border: 1px solid black; padding: 5px;"> Manual operation of radiator pump (for heating system 1) </div> | |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Circulation pump hot water exchanger →Off On </div> | <div style="border: 1px solid black; padding: 5px;"> Manual operation of the circulation pump that moves the hot water through the hot water exchanger. </div> | |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Mixing valve motor (Heating system 1) →Off Open Close </div> | <div style="border: 1px solid black; padding: 5px;"> Manually opening/closing shut motor (for heat system 1) (Note that the motor run time is 120 sec, which it why is can be difficult to see the motor open/close) </div> | |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Changing valve between upper/lower tank part →Lower Upper </div> | <div style="border: 1px solid black; padding: 5px;"> Manual operation of the exchange valve that decides if the heat pump will charge the upper or lower tank section. </div> | |
| ↓ | | |
| <div style="border: 1px solid black; padding: 5px;"> Electric heater L1 (1,5kW) →Off On Curr sens L1: 10,1A </div> | <div style="border: 1px solid black; padding: 5px;"> Manual operation of the electric heater stages 1.5 kW on phase L1 and current value on current sensor L1. When turning the system on, the power will increase by about 6.5A if current sensors are installed. </div> | |

| Display | Description | Comments |
|--|--|----------|
| Electric heater L2 (1,5kW) →Off On Curr sens L1: 10,1A | Manual operation of the electric heater stages 1.5 kW on phase L2 and current value on current sensor L2. When turning the system on, the power will increase by about 6.5A if current sensors are installed. | |
| ↓ | | |
| Electric heater L3 (1,5kW) →Off On Curr sens L1: 10,1A | Manual operation of the electric heater stages 1.5 kW on phase L3 and current value on current sensor L3. When turning the system on, the power will increase by about 6.5A if current sensors are installed. | |
| ↓ | | |
| El.h L1/L2/L3 (6kW) →Off On Curr sens: L1: 12.1A L2: 13.2A L3: 10.2A | Manual operation of the electric heater stages 6 kW (2 kW/phase) and current value on current sensors L1, L2 and L3. When turning on the system, the current will increase by about 8.7A per phase is current sensors are installed. | |
| ↓ | | |
| External error out-put signal →Off On | Manual operation of external alarm outlet | |
| ↓ | | |
| Room sensor error →Off On (Heating system 1) →Off On | Testing alarm diode on the room sensor | |

Manual operation - Heat pump

| Display | Description | Comments |
|---|---|----------|
| Run heat pump (Autostop if error or after 8 min) →Off On | Manual operation of heat pump module. (Compressor, charge pump 100%, brine pump) Operations run until the display is put in the "Off" position, an alarm on the heat pump module will sound immediately or after max. 8 minutes. | |
| ↓ | | |
| Brine pump →Off On | Manual operation of brine pump | |
| ↓ | | |
| Charge pump speed <-Low 0% High-> | Manual operation of charge pump. Adjust the speed in stages of 5% from 0-100. | |

Technical data

| Technical data | AquaPaQ 5 | AquaPaQ 8 | AquaPaQ 10 | AquaPaQ 12 |
|--------------------------|--|------------|------------|------------|
| Item No. | 9774705001 | 9774700401 | 9774705101 | 9774700501 |
| Dimensions (w x h x d) | 600 x 1830 x 730 mm | | | |
| Weight | 250kg | 253kg | 260kg | 265kg |
| Total volume | 205 l | | | |
| Insulation | 35 mm polyurethane | | | |
| Electrical connection | 400V N PE | | | |
| Electric heater | 7 step, 1.5 kW/step. Total 10.5 kW | | | |
| Soft starter | Standard | | | |
| Hot water | 2-stroke plate heat exchanger (safety valve not necessary) | | | |
| Heat control | Bivalent mixing valve | | | |
| Extra connections | 3 pc. DN20 out. | | | |
| Run as electric boiler | Yes | | | |
| Connection brine | Hose Ø 28 mm (connection right or left) | | | |
| Pressure drop evaporator | 1.3 kPa | 2.2 kPa | 3.2 kPa | 4.3 kPa |
| Pressure drop condenser | 2.0 kPa | 3.5 kPa | 5.5 kPa | 7.2 kPa |
| Brine media | R407C | | | |
| Refrigerant charge | 1700g | 1950g | 1950g | 1950g |
| Performance* | AquaPaQ 5 | AquaPaQ 8 | AquaPaQ 10 | AquaPaQ 12 |
| Heat output 0/35 | 5.60 kW | 7.69 kW | 9.77 kW | 11.25 kW |
| COP 0/35 | 4.03 | 4.39 | 4.31 | 4.35 |
| Heat output 0/45 | 5.38 kW | 7.33 kW | 9.28 | 10.70 kW |
| COP 0/45 | 3.24 | 3.49 | 3.44 | 3.44 |
| Heat output +5/35 | 6.64 kW | 9.17 kW | 11.55 kW | 13.35 kW |
| COP +5/35 | 4.64 | 5.07 | 4.97 | 5.03 |
| Heat output +5/45 | 6.30 kW | 8.65 kW | 10.95 kW | 12.60 kW |
| COP +5/45 | 3.72 | 4.00 | 3.96 | 3.97 |

Spare part list

| | Article number | | | |
|-------------------------------------|----------------|-----------|------------|------------|
| | AquaPaQ 5 | AquaPaQ 8 | AquaPaQ 10 | AquaPaQ 12 |
| Compressor | 521240500 | 520933800 | 520969100 | 520879800 |
| Receiver drier | 520837800 | 520837800 | 520837800 | 520837800 |
| Evaporator | 521204700 | 521204700 | 521241000 | 521241000 |
| Condensor | 521204800 | 521204800 | 521204800 | 521204800 |
| Low pressure pressostat | 521103900 | 521103900 | 521103900 | 521103900 |
| High pressure pressostat | 520930400 | 520930400 | 520930400 | 520930400 |
| Sight glass | 520930800 | 520930800 | 520930800 | 520930800 |
| Expansion valve | 521240600 | 521236700 | 521237100 | 521237100 |
| Circulation pump heat carrier | 521237900 | 521237900 | 521237900 | 521237900 |
| Circulation pump brine carrier | 521237900 | 521237900 | 521237900 | 521110300 |
| Circulation pump DHW heat exchanger | 521110400 | 521110400 | 521110400 | 521110400 |
| Contacteur heat pump unit | 521079900 | 521079900 | 521079900 | 521079900 |
| Power supply unit, 15VA | 521233200 | 521233200 | 521233200 | 521233200 |
| Circuit board heat pump unit | 521142500 | 521142500 | 521142500 | 521142500 |
| Hot gas sensor | 521137800 | 521137800 | 521137800 | 521137800 |
| Outdoor sensor | 521137600 | 521137600 | 521137600 | 521137600 |
| Room sensor | 521137500 | 521137500 | 521137500 | 521137500 |
| Standard sensor | 521138000 | 521138000 | 521138000 | 521138000 |
| Flow switch | 521115700 | 521115700 | 521115700 | 521115700 |
| DHW heat exchanger | 521028600 | 521028600 | 521028600 | 521028600 |
| Changing valve (with motor) | 521213000 | 521213000 | 521213000 | 521213000 |
| Mixing valve | 521003400 | 521003400 | 521003400 | 521003400 |
| Mixing valve motor | 521003500 | 521003500 | 521003500 | 521003500 |
| Electric heater (10,5kW) | 521029500 | 521029500 | 521029500 | 521029500 |
| Circuit board tank unit | 521125600 | 521125600 | 521125600 | 521125600 |
| Display board | 521127000 | 521127000 | 521127000 | 521127000 |
| Automatic fuses 3x16A | 521080500 | 521080500 | 521080500 | 521080500 |
| Contacteur | 521079700 | 521079700 | 521079700 | 521079700 |
| Overheat protector (110C) | 521029600 | 521029600 | 521029600 | 521029600 |
| Thermostat (65C) | 521232300 | 521232300 | 521232300 | 521232300 |
| Toroid transformer (65VA) | 521232100 | 521232100 | 521232100 | 521232100 |

Commissioning report

DATA

| | |
|---|---------------|
| Model: AquaPaQ <input type="checkbox"/> 5 <input type="checkbox"/> 8 <input type="checkbox"/> 10 <input type="checkbox"/> 12 | Order number: |
| Heat pump serial number: | Date: |
| Electricity metre reading: | |

INSTALLATION CHECK

| | |
|--|------------------------------------|
| The system is filled with water and has been aerated | <input type="checkbox"/> OK |
| Brine circuit aerated | <input type="checkbox"/> OK |
| Circulation in brine loop | <input type="checkbox"/> OK |
| Speed circulation pump brine loop | 1 2 3 |
| Speed radiator pump (if not variable) | _____ |
| Fuse heat pump | _____ A |

INSTALLER

| |
|------------------------|
| Company: |
| Address: |
| Postal address: |
| Signature: |
| Name in Block Letters: |

CUSTOMER

| |
|-----------------|
| Name: |
| Address: |
| Postal address: |
| Telephone: |

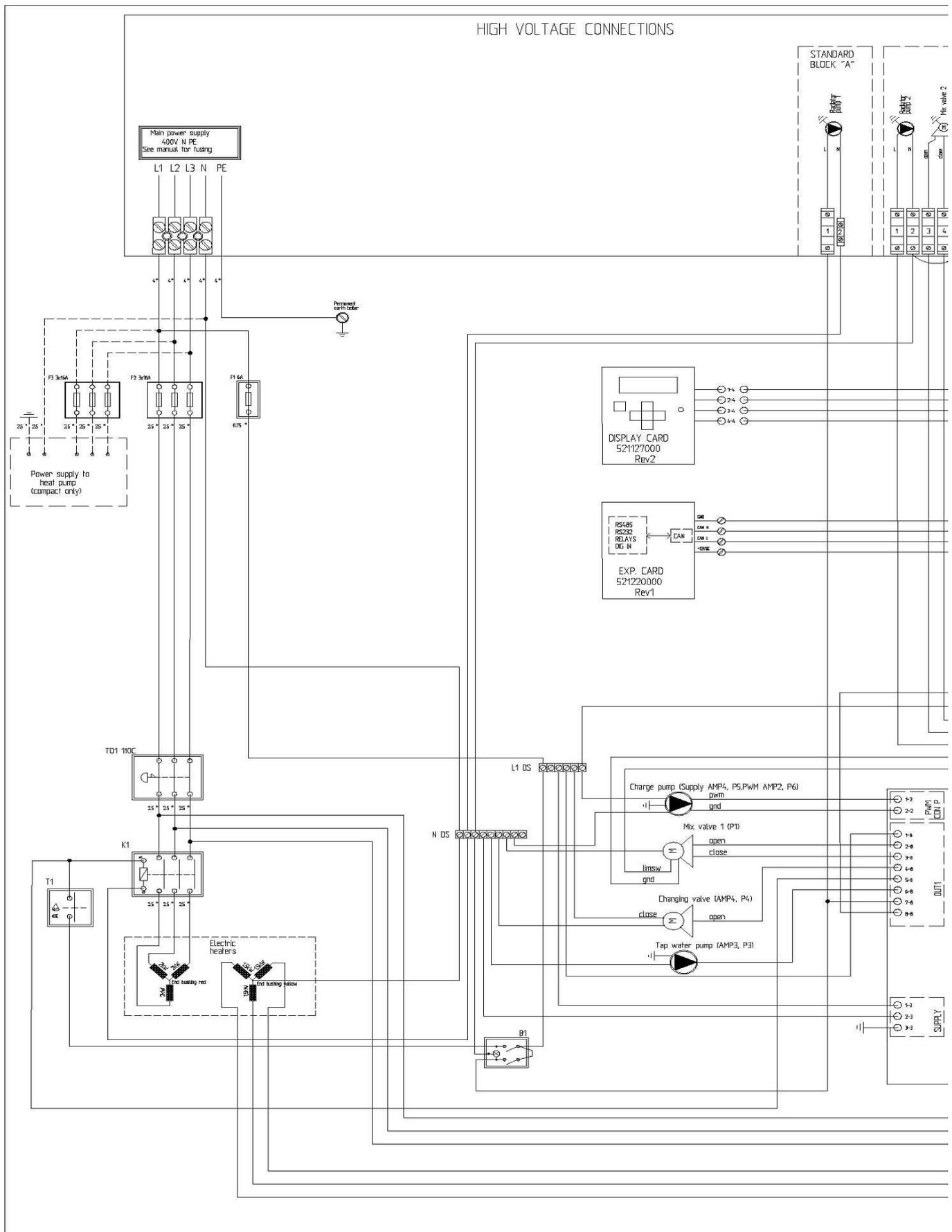
OPERATIONAL DATA

| | |
|--|----------|
| Temperature of brine to heat pump (in): | _____ °C |
| Temperature of brine fluid to heat pump (ut): | _____ °C |
| Temperature water to heat pump: | _____ °C |
| Temperature, water from heat pump | _____ °C |
| Temperature hot gas | _____ °C |
| Any adjustments from factory default settings: | |

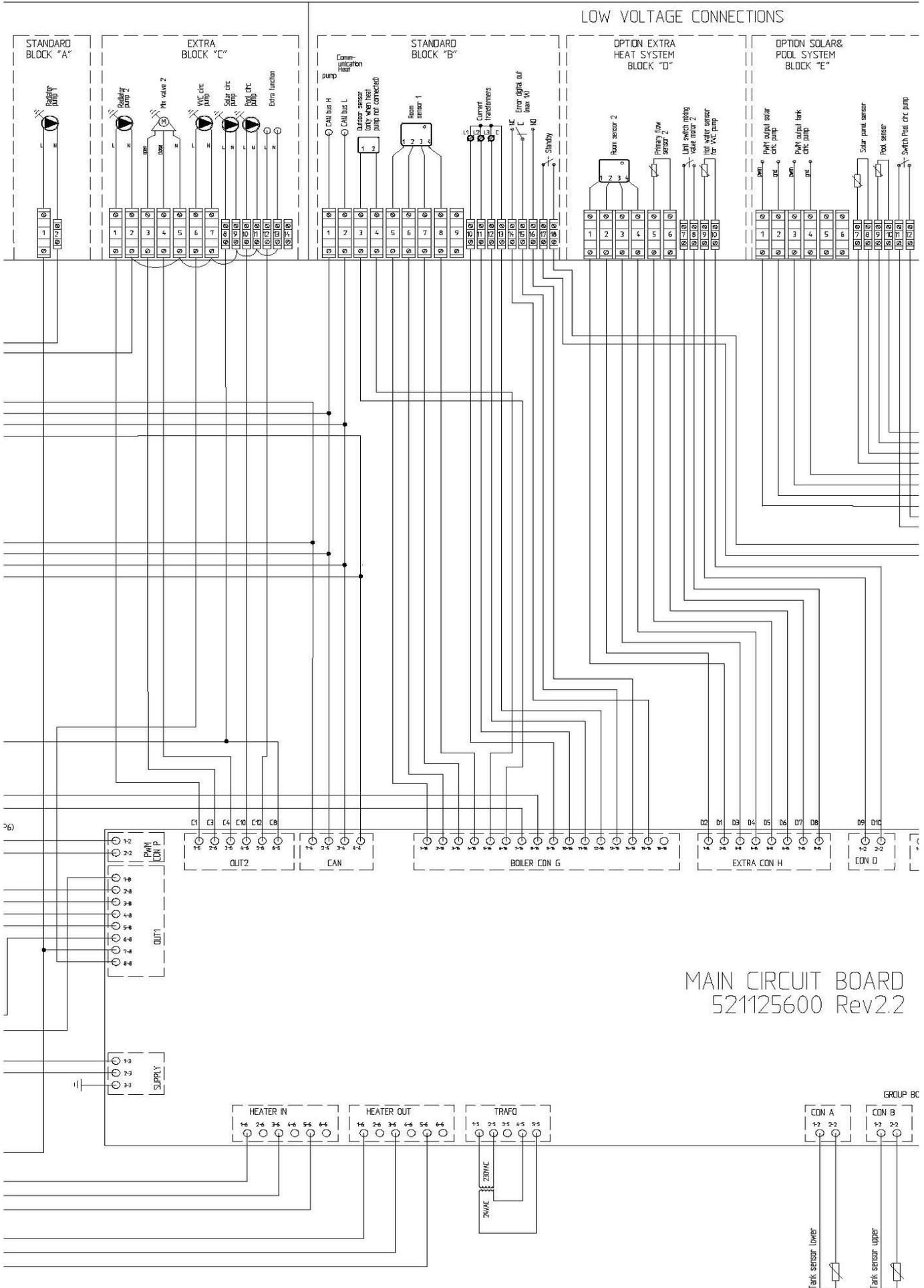
COMMENTS

| |
|--|
| |
|--|

Electrical diagram tank unit

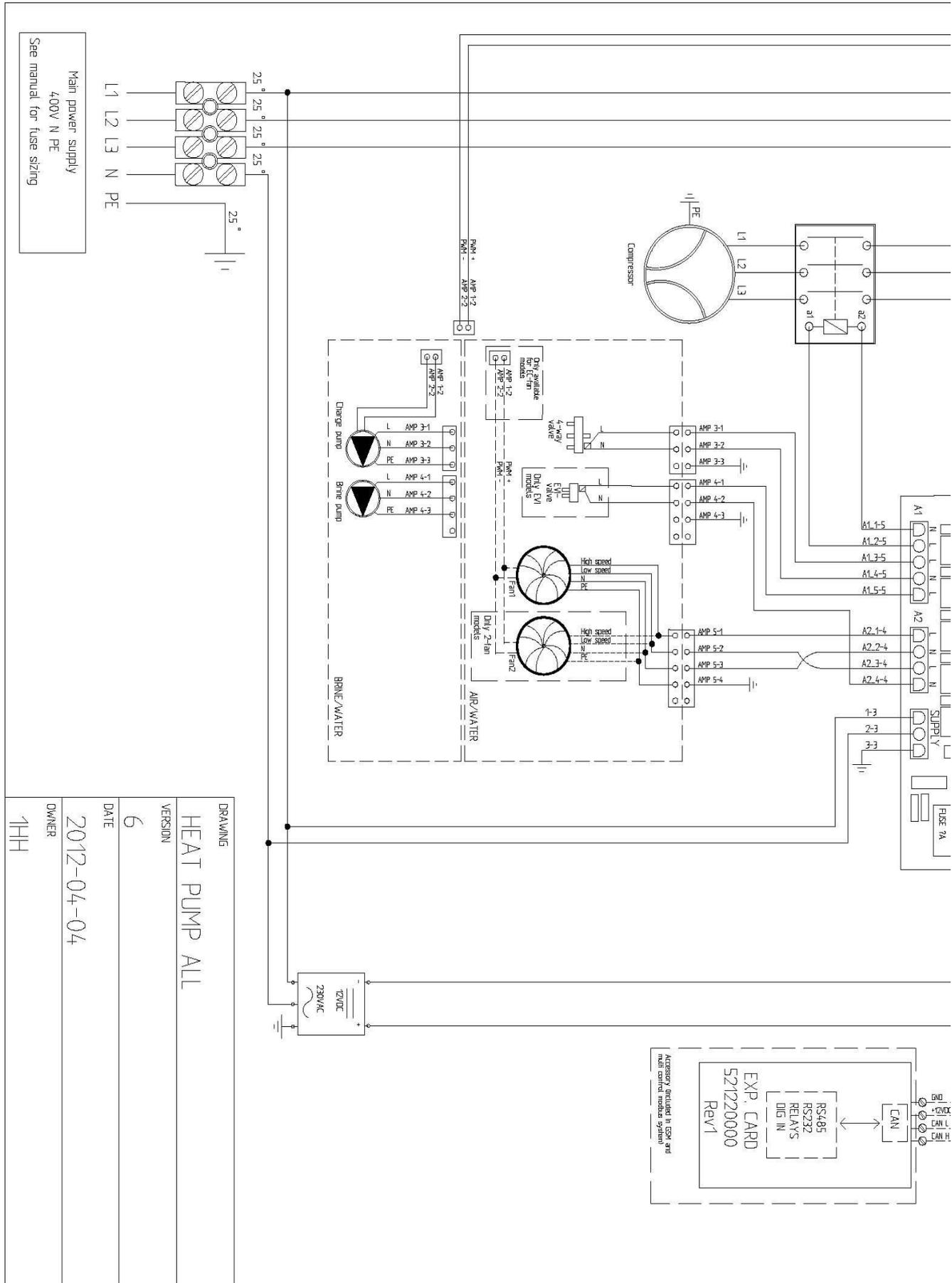


LOW VOLTAGE CONNECTIONS



MAIN CIRCUIT BOARD
521125600 Rev2.2

Electrical diagram heat pump module



Main power supply
400V N PE
See manual for fuse sizing

| | |
|---------|---------------|
| DRAWING | HEAT PUMP ALL |
| VERSION | 6 |
| DATE | 2012-04-04 |
| OWNER | 1HH |

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