EURONOM

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Installation and User guide for

ExoTank VPX300

1011-105 rev3 EN

EURONOM

"Original instructions for use"

Introduction

This manual is designed for the Euronom heating pump boiler ExoTank VPX. This manual deals with both installation and operation for just the boiler (electrical operation) and connection / operation using Euronom heating pump models ExoAir7.5 and 10.5, Polaris 10 and Exotic S 8 and 12.

The manual consists of eight chapters of which the first four cover installation. Chapters 5 and 6 describe electrical installation and provide a checklist prior to startup. Chapter 7 contains information on maintenance and inspection, while chapter 8 is intended for service engineers.

Read the instructions in this manual in order to prevent accidents ...

Euronom ExoTank VPX

Thank you for choosing to invest in a quality product! This product will minimise your electricity bills, saving you money for much nicer things. Whether you install just the tank, or both the tank and the heating pump, you can be sure that the system you receive will have the latest technology and all the reliability you are entitled to demand.

Both the heating pump and the tank are manufactured in Sweden, which has a long tradition of heating systems, and heating pumps in particular. All the tanks/heating pumps that come out of the factory have been technology and function tested. The quality is monitored continuously through all stages from the steel chassis to finished tank/heating pump.

The tank chassis is made from stainless steel, which means minimal maintenance and a sustainable structure with a long service life. Components included in the machine are selected for their functionality and quality from known suppliers, which means little servicing.

ExoTank VPX

ExoTank VPX is a newly developed tank/boiler designed and constructed for optimum heating pump operation. It has taken a long time to develop, but now we have achieved innovative new solutions for reducing direct electricity and ensuring better utilisation of the heating pump as a source of energy. Like the heating pumps in the same series, ExoTank VPX is made from stainless steel and has familiar quality labels on vital components. The control system for the ExoTank VPX is newly developed, allowing it to function as an electric boiler even without a heating pump with the integral 7-stage electric heater.

ExoAir & Polaris

ExoAir and Polaris are so-called air/water heating pumps that use the energy in the outdoor air (indirect solar energy) to transfer heat to your heating system through a cooling process and thereby provide cheap energy.

ExoAir is a tried and tested heating pump that operates at temperatures down to –15°C and water temperatures up to 60°C. An extra sound insulated compressor and the double thermal length of the heat exchanger give a high level of efficiency.

ExoAir Polaris is the fruit of innovative solutions as well as technological advancement on the compressor side, which means that you can have cheap heating from the air even when the outdoor temperature is as low as -25°C.

Exotic S

Exotic is a so-called liquid/water heating pump, which means that the energy is extracted from a collector coil in, for example, bedrock, surface earth, lakes, etc.
Exotic S has the same proven components as ExoAir and Polaris as well as extra thick noise insulation to prevent annoying noise.

Contents

We reserve the right to correct printing errors. We reserve the right to make design alterations.

TO HELP YOU REMEMBER

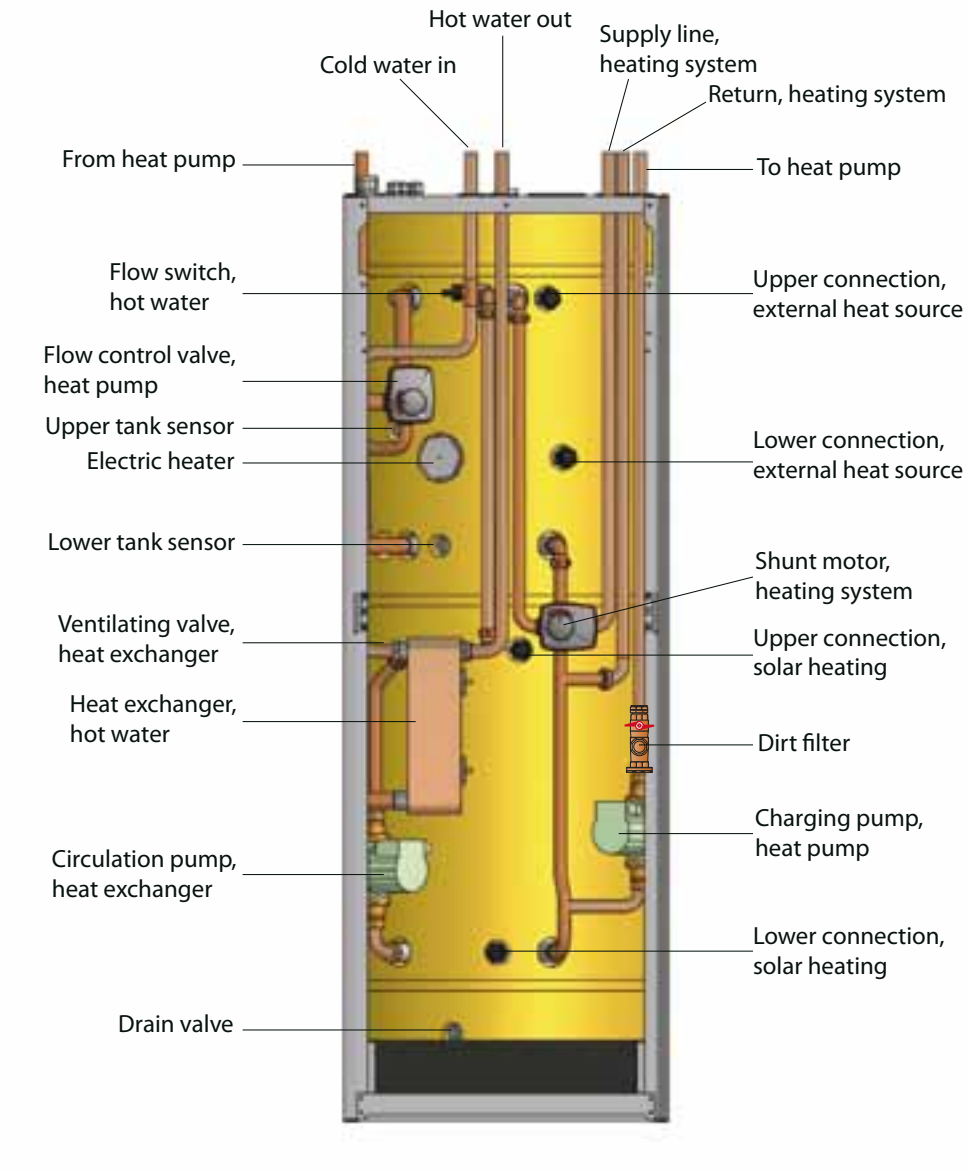
Complete the details below. It may be useful to have them to hand in case anything happens.

Product:	*Production number:*
Installer:	*Telephone number:*
Installation date:	

1 SUMMARY

ExoTank VPX is the complete boiler to meet the needs of your home for heating and hot water. It comes fitted with a motorised shunt valve that maintains a correct and even temperature at your radiators.

Figure 1. The illustration below shows the essential structure of the tank.



Your ExoTank VPX uses a well dimensioned flat heat exchanger to heat hot water, and surpasses by some margin the standards applicable to hot tap water.

The ExoTank VPX is easy to service thanks to readily accessible electric components and good troubleshooting functions in the control program. It comes with a room sensor as standard which is fitted with an LED which flashes in the event of a fault. The ExoTank VPX is fully prepared for connection to the outdoor air heating pumps ExoAir and Polaris or the water heating pump Exotic S. This supplement gives you a very eco-friendly, energy-efficient heating system.

1.1 DELIVERY

Important to remember

Check the following points on delivery and installation:

- The ExoTank VPX may be transported and stored both upright and lying down. The heating pump may be placed with the back facing down for a short time when it is received.
- Remove the packaging and check that the product has not been damaged during transportation. Report any transport damage to the shipping agent.
- Place the ExoTank VPX on a firm foundation, ideally made of concrete. If the product is to stand on a soft carpet, underlay panels must be placed under the levelling feet.
- Remember that a space for servicing of at least 1 metre must be left in front of the product.
- The ExoTank VPX may be lowered to below floor level.

Safety instructions

The following safety instructions must be taken into account when handling, installing and using the product:

- Shut off the safety switch before working on the product.
- The ExoTank VPX must not be rinsed with water.
- When handling the product with lifting eye bolts or similar, ensure that all lifting devices, eye bolts and other parts are undamaged. Never remain beneath an elevated product.
- Never jeopardise safety by removing covers, casings or other equipment.
- Never jeopardise safety by disabling the safety equipment.
- Only authorised persons are permitted to work on the product.
- Safety valve check:

  The safety valve for VPX/system and hot tap water must be checked regularly.

2 Operation

This chapter is designed for users and explains how your new heating system works and which settings you can make yourself.

2.1 The control unit.

Auxiliary thermostat: The thermostat operates as a safety device in case the controls break down and is directly connected mechanically to the electric heater's output stage 6kW.

The thermostat operates as an additional safety device in case the controls stop working, at which point the desired temperature for the boiler can be set. (Note: Normally the thermostat must be in auto mode and must only be used in emergencies.)

Overheat protection: The overheat protection prevents the boiler water/electric heater becoming too hot. If this trips, it can be reset by depressing the red button to the right of the thermostat.

Piston type fuse: The piston type fuse prevents the circuit board from being damaged in the event of a short-circuit for example. If the fuse blows, it can be reset by pushing it in. (Note: It will spring back.)

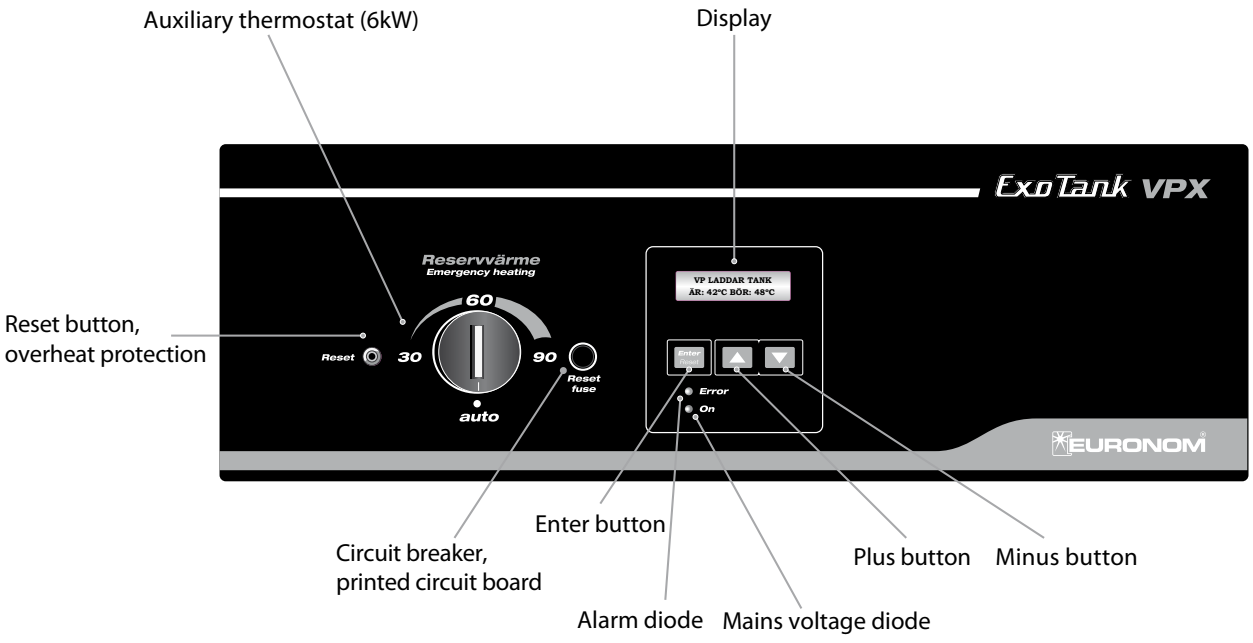
Status LEDs: The LEDs indicate the control status. During normal operation, the green LED (ON) must be on. In the event of an alarm, the red LED flashes (ERROR) until the alarm is reset. (The room sensor alarm LED also flashes when an alarm is triggered.)

The Enter button is used to scroll through the menus and to confirm settings.

The plus arrow is used to scroll up when setting values in the menus.

The minus arrow is used to scroll down when setting values in the menus.

Figure 2. The control unit



2.2 Program structure

The program has a simple structure of main menus that provide a good overview. There are two program modes: Standby/ Alarm and Setting mode.

To toggle between the various modes, use the ENTER button by keeping it depressed for at least two seconds. This shift can be done in all modes, even in a menu. The various modes are described below.

Standby/Alarm: This part of the program continually shows the status of the system. In normal operating mode, it shows whether the heating pump is active and prevailing temperatures.

In the event of an error where an alarm is triggered, the alarm text will appear. In the same way, any time delays will appear if they are active.
Standby appears automatically after 15 minutes if no buttons are touched.

Setting mode: In this program mode, system settings can be made and current operating parameters viewed. When shifting from standby display, you are directed to the main menu that consists of four submenus.

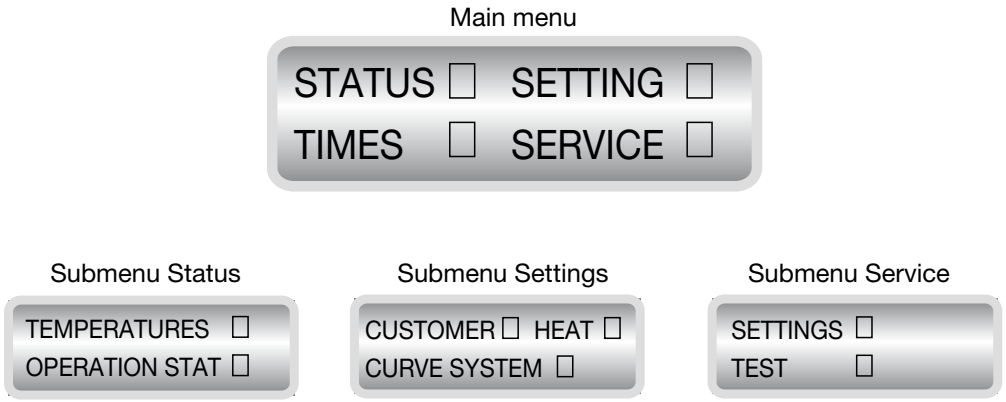
2.2.1 Menu system – setting mode

Figure 3 below shows the menu structure of the program.

The top display text is the main menu, to which you always come back to after being in one of the submenus.

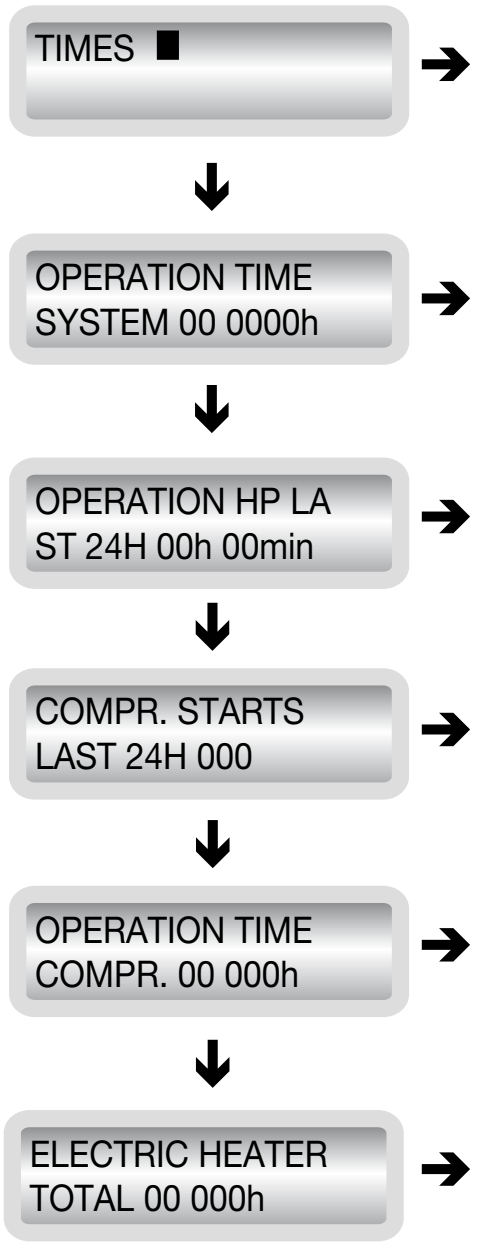
Use the ENTER button to scroll through the menus. To exit a menu, keep the ENTER button depressed for at least two seconds, whereupon you come to the standby texts.

Figure 3. Menu structure



2.3 Menu – TIMES

This part of the menu contains operation times for the system and compressor



2.4 Menu – STATUS

The status menu provides information about the system's actual temperatures as well as which outputs (relays) are active.

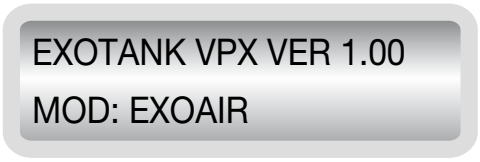
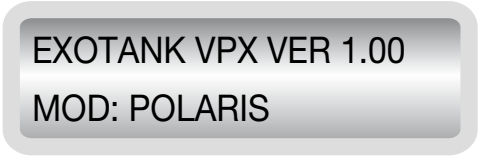
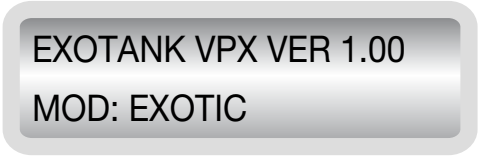
2.4.1 Temperatures

Display	Explanation	Comments
TEMPERATURES ■		
LOWER TANK 42°C SET VALUE 38°C	The actual tank temperature in the lower part (low temp section) as well as the set value that the system is to reach. The set value varies depending on the house curve setting.	
UPPER TANK 52°C SET VALUE 55°C	The actual tank temperature in the upper part (high temp section) as well as the set value that the system is to reach. The set value varies depending on the setting in the customer menu.	
PRI.FLOWTMP 32°C SET VALUE 32°C	The current temperature of water sent to radiator and/or the underfloor heating system. The set value depends on the house curve set.	
ROOM TEMP 20.5°C SET VALUE 20.0°C	Shows the actual room temperature and set value. Set the room temperature in the customer menu. Only shown if room sensor operation is selected in the customer menu.	*Only shown if room sensor operation is selected in the customer menu.*
HEAT PUMP SENSOR 45°C	Current temperature at the heating pump supply sensor.	*Displayed only if a heating pump is installed.*
HOTGAS TEMP 85°C OUTDOOR TMP 2°C	Actual hot gas temperature on the heating pump's delivery pipe and actual outdoor temperature.	*Displayed only if a heating pump is installed.*
POSSIBLE DEFROST 32 MIN GIV -4°C	Current temperature on defrost sensor and time remaining until any defrosting will be initiated. For more information, see also chapter 2.6.1.	*Displayed only if a heating pump is installed and for model ExoAir or Polaris.*

BRINETEMP -2ºC LARMTEMP -10ºC	Current temperature of the brine and the temperature at which the system gives an alarm for low brine temperature.	*Displayed only if a heating pump is installed and for model Exotic S.*

2.4.2 Operation status

Display	Explanation	Comments
OPERATION STAT ■		
COMPRESSOR □ CHARGE PUMP □	Operation status for compressor and charge pump. A filled in box means that the component is operating.	*Displayed only if a heating pump is installed and for model ExoAir and Polaris.*
COMPRESSOR □ C.PUMP □ B.PUMP □	Operation status for compressor, charge pump and brine pump.	*Displayed only if a heating pump is installed and for model Exotic S.*
FAN SPEED OFF ■ LOW □ HIGH □	Current fan speed.	*Displayed only if a heating pump is installed and for model ExoAir and Polaris.*
CURRENT POWER EL HEATER 4.5kW	Current electrical output fed to the electric heater. The electric heater has seven power stages: 1.5 / 3.0 / 4.5 / 6.0 / 7.5 / 9.0 and 10.5kW.	
CURRENT 18.6A MAIN FUSE 20A	Current power consumption for the building and installed main fuse in the group distribution box. In the case of currents exceeding the size of the main fuse, the controller automatically reduced power consumption by interrupting operation for the power modes for the electric heater in stages.	*If current transformers are not installed, the power house will display 0A.*
PRESSOSTATE OK □ MOTORPROT. OK □	Status of pressostat and motor protection. (A box filled in means correct function).	*Displayed only if a heating pump is installed.*
4-VAY VALVE □ EVI VALVE □	Information on whether defrost is in progress and whether the EVI valve is active.	*Displayed only if a heating pump is installed and for model ExoAir and Polaris.*

Display	Explanation	Comments
	Information about whether the shunt valve motor's limit position is active. The limit acts as a block and prevents the shunt valve from opening to the hot water section before an adjustable time has been reached. The delay time is set in the service menu. (When operating without a heating pump, the limit is of no practical significance and the shunt valve may open with no delay.	
	The box shows whether the boiler-integrated circulation pump to the hot water exchanger is active. When hot water is drawn off, this pump starts automatically.	*Displayed only if a heating pump is installed.*
	Information on the limit for the upper tank's reverse valve is activated. When charging to a lower tank, the limit must be activated (filled in). When charging to the upper part, the limit must be inactivated (not filled in).	
	Program information and model ExoAir heating pump.	*Displayed only if a heating pump is installed and for model ExoAir.*
	Program information and model Polaris heating pump.	*Displayed only if a heating pump is installed and for model Polaris.*
	Program information and model Exotic heating pump.	*Displayed only if a heating pump is installed and for model Exotic.*

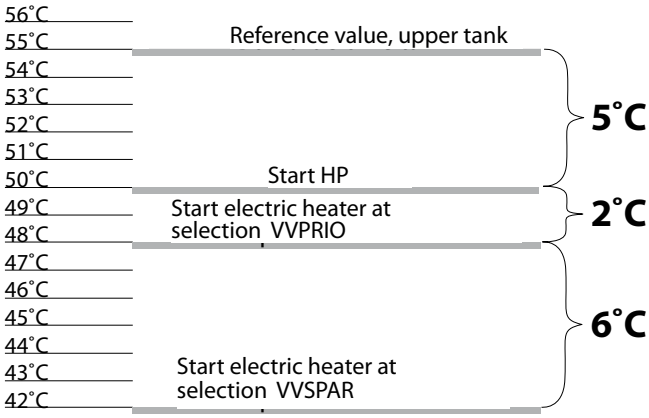
2.5 Menu - SETTING

This menu group contains settings for the system as well as language settings and house curve etc.

2.5.1 Customer

Display	Explanation	Comments
CUSTOMER ■		
ROOMTEMP 21.0°C SET TEMP 20.5°C	Actual and desired room temperature.	*Only shown when room sensor operation is selected.*
SET TEMP UPPER TANK 55°C	Setting desired temperature in the upper tank section. Note that a higher temperature setting will give poorer efficiency for the system and means that direct electricity from an electric heater may be required in order to achieve the higher temperature. To increase hot water comfort, it is better to adjust parameters in the house curve. See also chapter 2.5.2.	
HOT WATER PROD. ECONOMY ■ PRIO □	HPB 300 primarily uses the heating pump as a source of heating for both building heating and hot water. To be able to save even more energy, there is an option which gives the heating pump the opportunity to supply the hot water requirement to an even greater extent. If you select "VVSPAR", what is known as the hysteresis is extended for electric heater operation, which means that the heating pump has longer to try to meet the need. This option is recommended in most instances, but it can slightly impair hot water comfort. The "VVPRIO" option means that the power stages of the electric heater operate at an earlier temperature (lower hysteresis). This means that the electric heaters, together with the heating pump, will meet the need. As the electric heaters have to operate earlier if you select this option, this means better hot water comfort by slightly poorer energy savings. See the diagram below for an example. The set value for the upper tank is 55ºC and the heating pump starts in both cases when the temperature has fallen to 50ºC. If you select "VVPRIO", the first stage of the electric heater will start if the temperature has fallen to 48ºC. If you select "VVSPAR", the first electric stage does not start until/unless the temperature has fallen to 42ºC.	

Figure 4.



2.5.2 House curve

The house curve is a way of controlling how hot water is to be sent to the house radiators or underfloor heating system. This is mainly done using the outdoor temperature but room temperature can also be used as a control parameter if a room sensor is installed.

Essentially, the house curve can be described of the relationship between the outdoor temperature and the temperature of the water sent (shunted) out into the house.

A well set house curve gives a comfortable room temperature regardless of the outdoor temperature and can also reduce energy costs.

The house curve is unique to each installation/house and may require adjustment several times to give optimal heating comfort.

The following settings are possible:

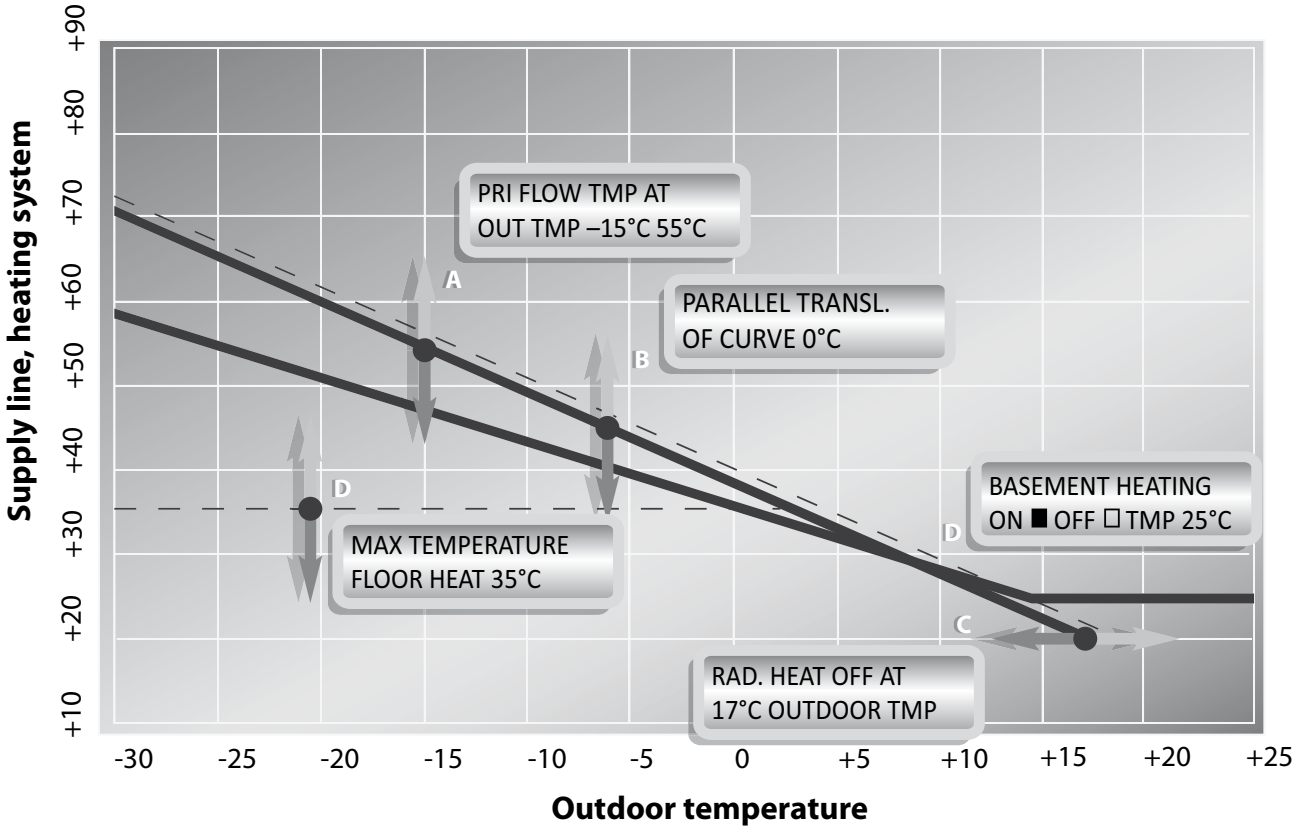
Point A: This point means that the curve's slope is moved up or down.

Point B: This point allows the entire curve to be moved up or down (parallel offset). The slope of the curve is not affected.

Point C: This point also changes the curve's slope and indicates at which outdoor temperature the shunt valve is to close completely, i.e. when there is no demand for heating.

Point D: This option is only valid if the option "Only underfloor heating" is selected in the customer menu and means that the shunt valve limits the temperature of the underfloor heating system, I.e. the temperature of the underfloor heating loops can never exceed the set value in this box.

Diagram 1. House curve



Display	Explanation	Comments
HEAT CURVE ■		
PRI FLOW TMP AT OUT TMP -15°C 55°C	Outlet temperature to radiators or underfloor heating system at -15°C outdoor temperature. Compare point A in diagram 1.	
PARALLEL TRANSL. OF CURVE 0°C	Makes it possible to move the house curve vertically up or down. (±10°C). Compare point B in figure 10.	
RAD. HEAT OFF AT 17°C OUTDOOR TMP	When the outdoor temperature reaches the set value in this menu, the shunt valve closes completely, i.e. no heat is sent to radiators/ underfloor heating. Compare point C in diagram 1.	
MIN ALLOWED TEMP LOWER TANK 35°C	Minimum permitted tank temp is the lowest temperature that the system (heating pump + any external heat) permits the tank temperature to drop to. This temperature can be increased to enhance hot water comfort. Note that increasing the temperature reduces the efficiency of the heating pump.	
HOT WATER CHARGE AT OUTD TMP 15°C	This menu allows you to set a transition point when the lower tank is to be charged to max. temperature (solid condensing). Used mainly to achieve good hot water comfort during the summer months.	
FLOOR HEAT ONLY? YES □ NO ■	If the house only has underfloor heating, the outlet temperature from the shunt valve can be limited.	
MAX TEMPERATURE FLOOR HEAT 35°C	The maximum permitted outlet temperature from the shunt valve during underfloor heating. Compare point D in diagram 1.	*Only appears when "Only underfloor heating" is selected.*
BASEMENT HEATING ON □ OFF ■ TMP 25°C	Basement heating means that heating can be shunted out even if the outdoor temperature is above the set value in the menu "RADIATOR HEATING OFF". To activate/deactivate the function, scroll up/down using +/-.	

2.5.2 Example of house curve settings

Diagram 2. Adjustment of house curve point A

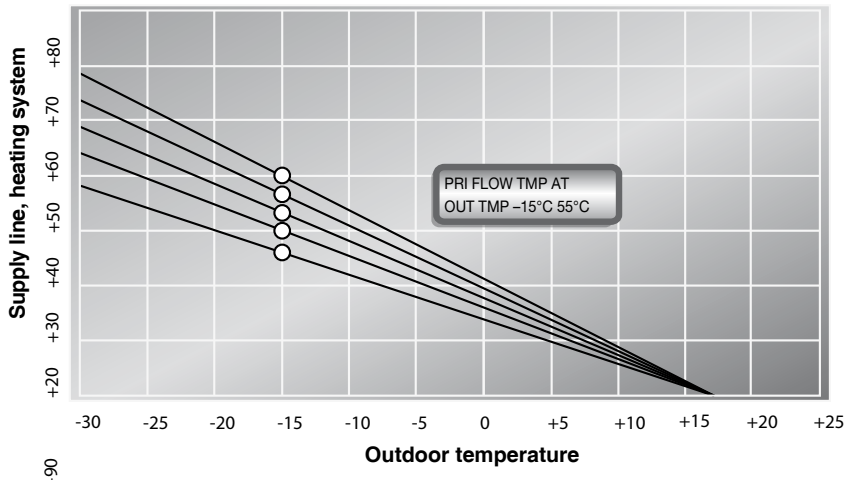


Diagram 3. Adjustment of house curve point B

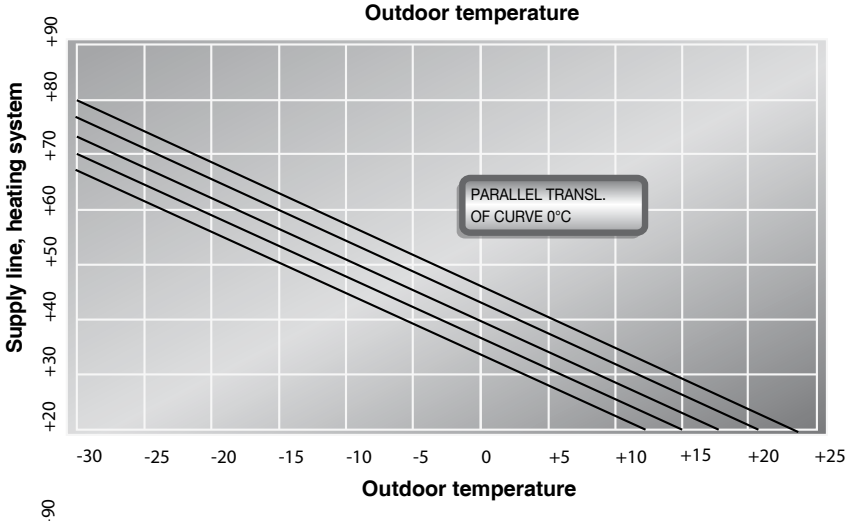
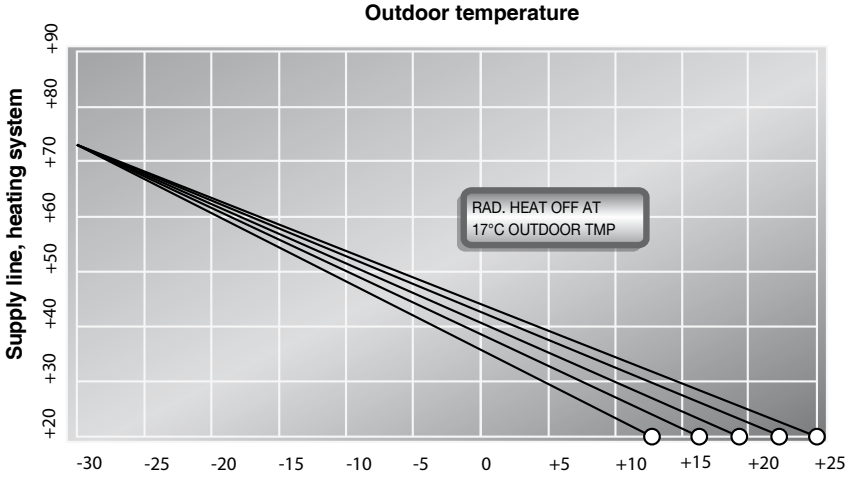


Diagram 4. Adjustment of house curve point C



2.5.3 Heating pump operation towards Exotank VPX

The heating pump operates according to the prioritisation principle and will operate initially to meet the need in the upper part of the boiler, the high temp section. When charging to the upper part, the water flow is regulated via the heating pump, which means that the temperature from the heating pump is always high irrespective of the temperature of the water to the heating pump. This means that the electric heater only needs to be used in the event of major discharge tappings or where heating pump output cannot meet the current power requirement for the building.

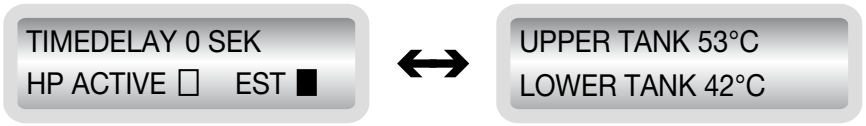
When the need in the upper part is met, the lower part - low temp section - will be heated to the set value. To ensure the temperature in the tank, the heating pump works towards the set value from the house curve + 5°C. I.e. if the demand to the house radiators at a certain time is 40°C, the heating pump heats the water to 45°C.

The heating pump can be reset no earlier than 10 minutes after a stop.

Nor does restarting take place until the temperature in either the upper or the lower part has fallen below a temperature which can be set from service (default 5 ºC), known as hysteresis. Therefore, restarting takes place if either the upper or the lower tank temperature falls 5ºC below the set value for the upper or the lower part.

Immediately after the heating pump stops, an information text is displayed indicating the minimum time delay (600 sec.) and whether the temperatures in the upper/lower part are blocking a start. As long as the box at "HP REST" is filled in, the system will wait for the temperatures to fall as per the explanations above.

The current temperature for the upper and lower part is displayed at the same time as the information text.



Regardless of the house curve, there is a minimum tank temperature that the heating pump always must maintain, the minimum permitted tank temp, which is set in the house curve menu.

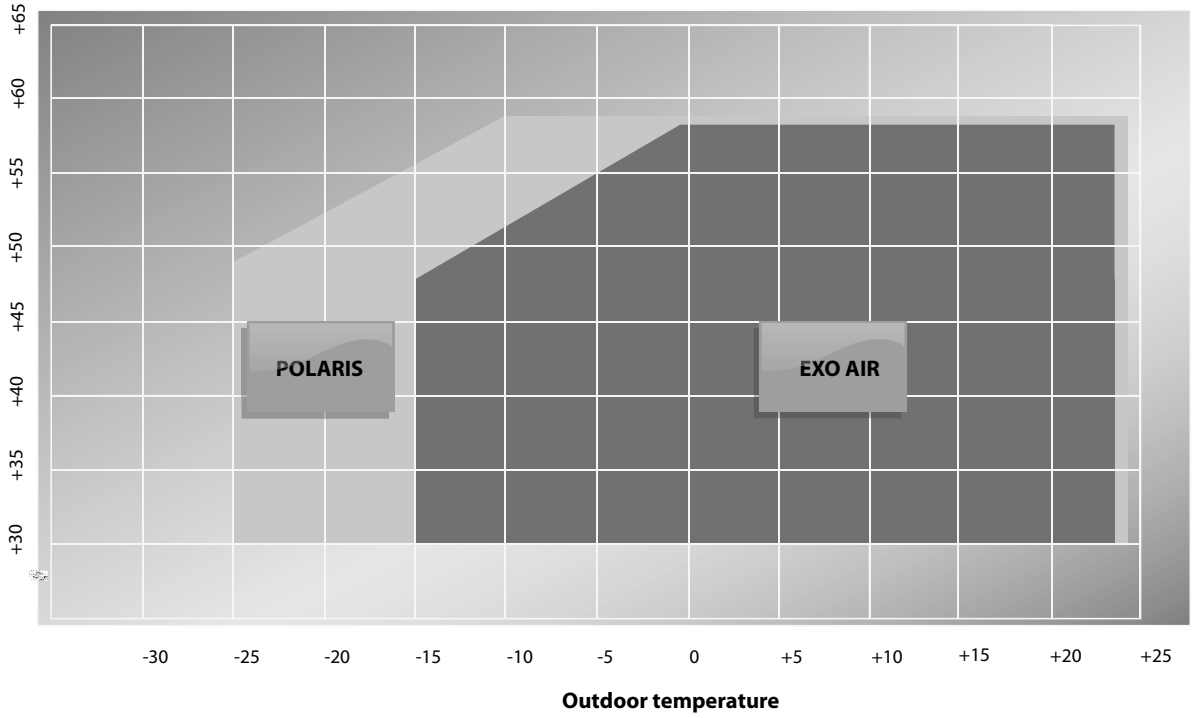
The heating pump operates as much as possible to supply both the lower and the upper tank section. However, there are temperature restrictions; which means that the operating area of the heating pump may vary from the house curve's value or the set value in the upper tank section.

The working areas also differ depending on which heating pump model is installed.

> For the Exotic S, max temperature (set in the service menu) is reached under all operating conditions.

> For ExoAir and Polaris, maximum temperature is restricted when the outdoor temperature is low. This means that the maximum temperature that can be achieved is not always the same as the max value set in the service menu. Restriction due to outdoor temperature can be viewed in diagram 5 below. The diagram is based on the set maximum temperature 57ºC.

Diagram 5. Temperature restriction at low outdoor temperatures (ExoAir and Polaris).



2.5.4 Electric heater operation

The ExoTank VPX, unlike the majority of boilers available on the market, primarily uses the heating pump to heat the high pump part; cf. the hot tap water section. This keeps direct electricity (electric heater operation) to a minimum as far as possible. In some instances, e.g. discharge tappings or where the power requirement for the building exceeds the heating pump, it is however necessary for the electric heater to provide support.

The seven stages are connected in stages from 1.5kW up to 10.5kW depending on the temperature drop. Power restriction due to the size of the main fuse may, however, mean that not all stages can be connected. If an error occurs or if heating pump operation is interrupted before the set value is achieved, the power stage 6kW will be connected directly.

A basic diagram showing the function of the electric heater can be seen in figure 5 below.

If there are any faults in the automatic controls, it is possible to connect the electric heater's 6kW stage manually by rotating the thermostat for auxiliary heating to the desired temperature, see figure 6.

Figure 5. Function of the electric heater.

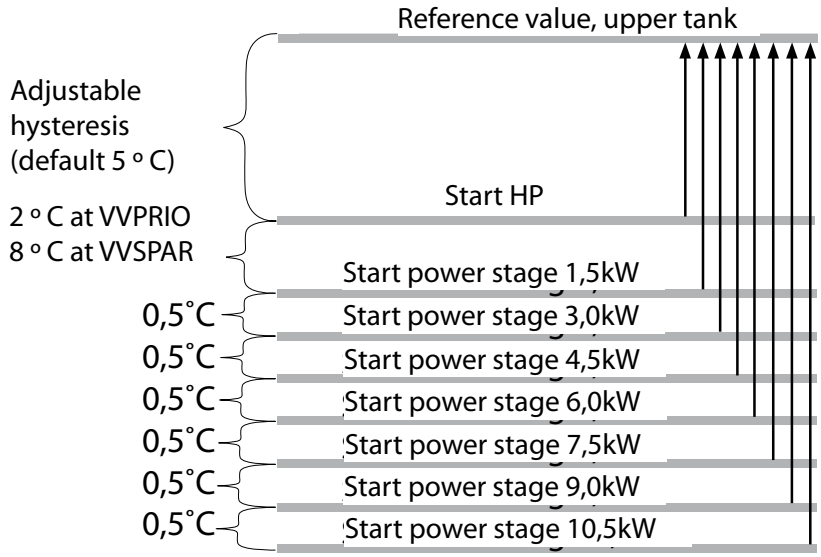
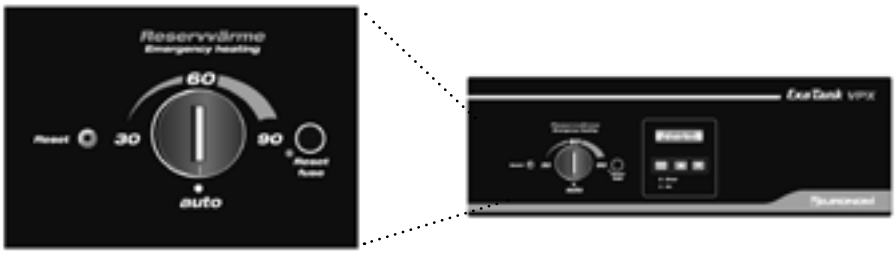


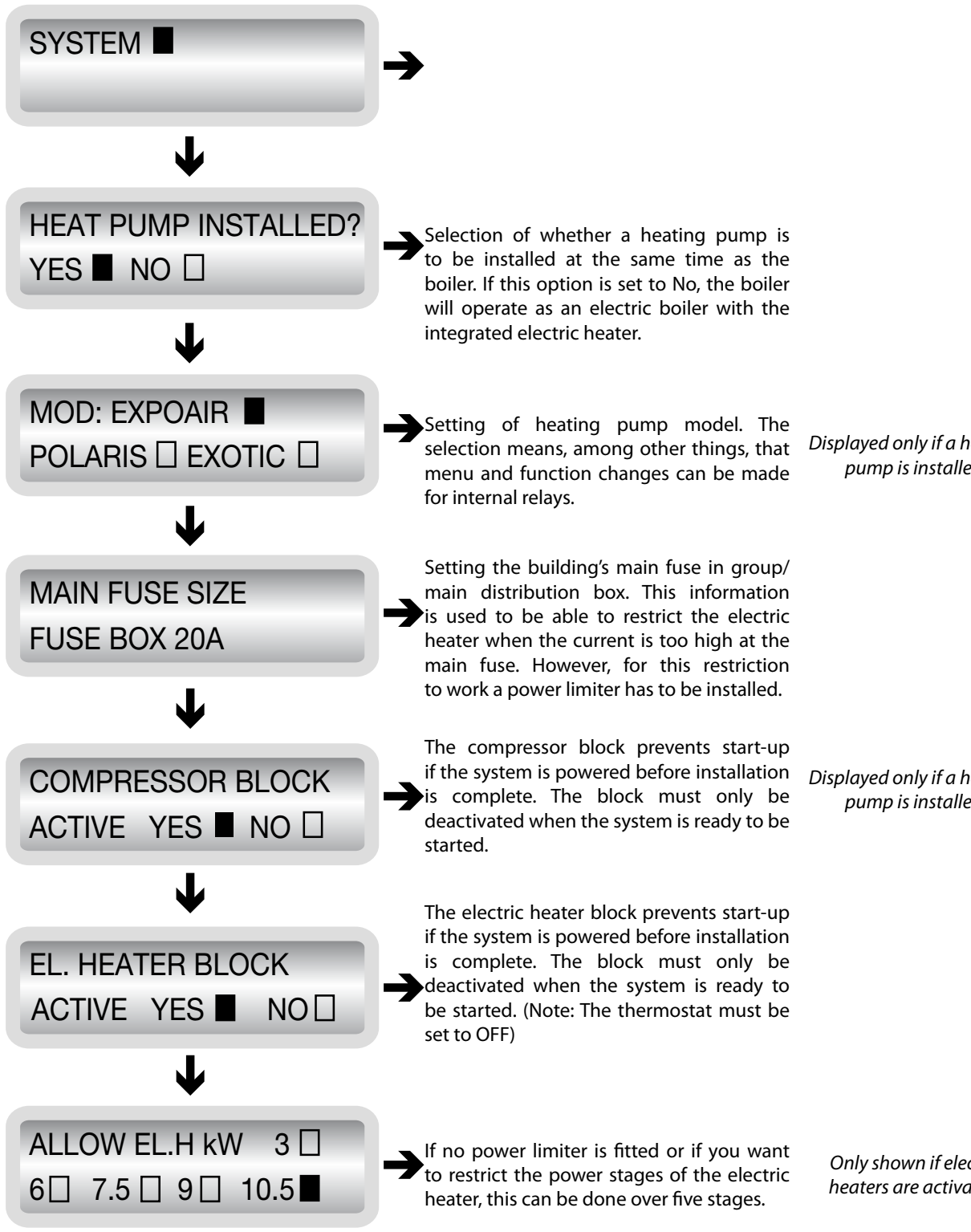
Figure 6. Manual thermostat.



2.5.5 System

The system menu may only be managed by the installer and/or service technicians. Settings are defined in the menu for the heating pump and how the heating system looks and is to be controlled.

> Faulty settings may result in damage to the system and/or the heating pump.



2.6 Menu – SERVICE

The service menu enables installers and service technicians to make advanced settings and manually test operate components included. Service mode can only be accessed via a PIN code and settings should not be made without being familiar with the system or before consulting an installer/supplier.

> PIN code =1, 2, 3.

The menu opens for 15 minutes after the code has been approved.

2.6.1 Settings

Display	Explanation	Comments
SETTINGS		
HIGH FAN SPEED AT 10°C OUTD. TMP	Setting for the switching temperature when the fan should work at the highest speed. This temperature is also used as a switching temperature for the EVI circuit in Polaris.	*Displayed only if a heating pump is installed and for model ExoAir or Polaris*
TEMPHYSTERESIS HP LOW. TANK 5°C	Setting the temperature hysteresis for restarting the lower part of the tank. If there are a lot of start/stops or if you wish to extend the operating time for the heating pump, this parameter can be adjusted.	*Displayed only if a heating pump is installed.*
TEMPHYSTERESIS HP UPP. TANK 5°C	Setting the temperature hysteresis for restarting the upper part of the boiler (hot water section). When operating without a heating pump, this hysteresis is the starting signal for the electric heater.	
DELAY MIXING VLV TO U.TANK 180 MIN	There is a parameter limit in the shunt valve motor, which is activated when the shunt valve tries to open towards the upper tank section. To prevent the shunt valve from using the "more expensive" energy in this section, a time delay starts, which forces the shunt valve to wait a certain amount of time before it can open to the hot water section. If the need remains after the set time, the shunt valve opens towards the hot water section.	

DEFROST START AT SENSOR TEMP -4°C

Indicates start temperature for a defrost to be initiated. Defrost is temperature and time dependent according to the following:

Depending on the prevailing outdoor temperature, a time interval of 45-60min is set (calculated active compressor time). When this time is reached, the evaporator temperature is competed with the set value. If, at the time of reading, the temperature falls below the set value, a defrost cycle is initiated.

Defrost continues until the sensor temperature has increased the stop temperature, which is set in the next box. Max. defrost time is 12 minutes, irrespective of whether the stop temperature has been reached.

Displayed only if a heating pump is installed and for model ExoAir or Polaris.

DEFROST STOP AT SENSOR TEMP 18°C

Stop temperature, defrost. See explanation in the box above.

Displayed only if a heating pump is installed and for model ExoAir or Polaris.

FREEZE ALARM FOR BRINE AT -10°C

Setting freeze alarm for brine fluid for the fluid-water heating pumps Exotic S.

Displayed only if a heating pump is installed and for model ExoAir or Polaris.

MAX TEMPERATURE HP 57°C

Setting maximum temperature for heating pump. (Note that the maximum temperature is reduced for *ExoAir* and *Polaris* depending on the outdoor temperature, see diagram 4,

Displayed only if a heating pump is installed.

CALIBRATION HOT GAS SENS 97.7°C

Enables calibration of hot gas sensor.

Displayed only if a heating pump is installed.

CALIBRATION OUT-DOOR SENS 5.7°C

Enables calibration of outdoor sensor.

CALIBRATION ROOM SENSOR 20.7°C

Enables calibration of room sensor.

Only appears if room sensor operation is activated.

2.6.2 Test

The test menu enables manual activation of the different control relays and therefore enables troubleshooting at component level. All relays switch off when the test menu is accessed.

Display	Explanation	Comments
CHARGE PUMP ON☐ OFF ☐	Manual operation charge pump	*Displayed only if a heating pump is installed.*
BRINE PUMP ON☐ OFF ☐	Manual operation brine pump.	*Displayed only if a heating pump is installed and for model ExoticS.*
FAN HIGH SPEED ON☐ OFF ☐	Manual operation fan high speed. (In *Polaris*, the solenoid valve to the EVI circuit is also activated when fan high is activated.)	*Displayed only if a heating pump is installed and with model ExoAir or Polaris.*
FAN LOW SPEED ON☐ OFF ☐	Manual operation fan low speed.	*Displayed only if a heating pump is installed and for ExoAir or Polaris.*
COMPRESSOR ON☐ OFF ☐	Manual operation compressor. (Charge pump starts automatically with this option.)	*Displayed only if a heating pump is installed*

Display	Explanation	Comments
4-VAY VALVE ON ☐ OFF ☐	Manual opening of the heating pump's 4-way valve.	*Displayed only if a heating pump is installed and for model ExoAir or Polaris.*
MANUAL DEFROSTING ON ☐ OFF ☐	Manual defrost. (Compressor, charge pump, 4-way valve activated.) Can be used for forced defrost. Max time 10 minutes.	*Displayed only if a heating pump is installed and for model ExoAir or Polaris.*
MIXING VALVE OPEN ON ☐ OFF ☐	Manual opening of shunt valve motor	
MIXING VALVE CLOSE ON ☐ OFF ☐	Manual closing of shunt valve motor	
ELECTRIC HEATER 1.5kW ON ☐ OFF ☐	Manual operation of electric heater 1.5kW stage	
ELECTRIC HEATER 3kW ON ☐ OFF ☐	Manual operation of electric heater 3kW stage	
ELECTRIC HEATER 6kW ON ☐ OFF ☐	Manual operation of electric heater 6kW stage	
CHANGING VALVE OPEN ON ☐ OFF ☐	Manual opening of reverse valve to upper tank.	*Displayed only if a heating pump is installed.*
CHANGING VALVE CLOSE ON ☐ OFF ☐	Manual closing of reverse valve to upper tank.	*Displayed only if a heating pump is installed.*
SENSOR SWITCH (RE22) ON ☐ OFF ☐	Manual activation of sensor switch relay 22.	*Displayed only if a heating pump is installed.*
DIODE TEST ROOM SENSOR ON ☐ OFF ☐	There is a red LED on the room sensor that should flash when activated.	

2.7 Error messages

> In the event of an error, this appears in the display's standby/alarm mode.

> Alarms take precedence over standby texts.

> Acknowledge the alarm by pressing "ENTER" (do not hold down the button).

> The alarm can only be reset if the error is corrected.

> In cases where more than one error occurs, the error with the highest priority is displayed.

The alarms are shown in order of priority below.

Display	Explanation	Comments
>>PHASE ERROR HP<< CHECK & RESTART!	This error is initiated if the hot gas temperature on the pressure pipe does not rise when the compressor starts. In most cases, this is because the phase sequence is incorrect. Check the phase sequence and restart. The error may also be due to the hot gas sensor being defective/having come loose or being incorrectly connected. (The alarm cannot be reset using the Enter button.).	*Displayed only if a heating pump is installed.*
>>>>>ERROR<<<<< HOT GAS HIGH	The alarm can be due to several things. If the error recurs, contact cooling service. For troubleshooting see chapter 8.5 Troubleshooting guide.	*Displayed only if a heating pump is installed.*
>>>>>ERROR<<<<< MOTORPROT. COMPR	This alarm is because the motor protection to the compressor has been tripped due to excessively high current or phase dropout. If the error recurs, contact service. For troubleshooting see chapter 8.5 Troubleshooting guide.	*Displayed only if a heating pump is installed.*
>>>>>ERROR<<<<< PRESSOSTATE H/L	The alarm indicates that the pressure in the heating pump is too high or too low. If the error recurs, contact service. For troubleshooting see chapter 8.5 Troubleshooting guide.	*Displayed only if a heating pump is installed.*
>>>>>ERROR<<<< LOW BRI.TMP –12°C	Alarm indicating that the brine temperature has dropped below the set cut-out temperature. If the error recurs, contact service. For troubleshooting see chapter 8.5 Troubleshooting guide.	*Displayed only if a heating pump is installed and for model Exotic S.*
>>>>>ERROR<<<<< DEFROST SENSOR	Fault in defrost sensor. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5 Troubleshooting guide.	*Displayed only if a heating pump is installed and for model ExoAir or Polaris.*

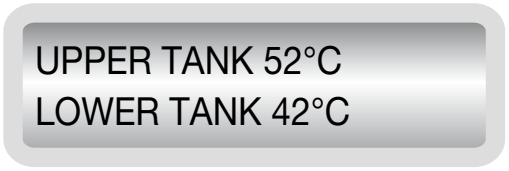
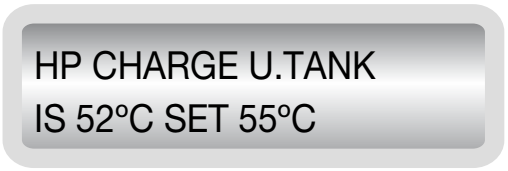
Display	Explanation	Comments
>>>>>ERROR<<<<< BRINE SENSOR	Fault in brine sensor. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5	*Displayed only if a heating pump is installed and for model Exotic S.*
>>>>>ERROR<<<<< HEAT PUMP SENSOR	Fault in HP sensor. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5	*Displayed only if a heating pump is installed.*
>>>>>ERROR<<<<< PRI. FLOW SENSOR	Fault in supply line. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5 Troubleshooting guide.	
>>>>>ERROR<<<<< HOT GAS SENSOR	Fault in hot gas sensor. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5 Troubleshooting guide.	*Displayed only if a heating pump is installed.*
>>>>>ERROR<<<<< OUTDOOR SENSOR	Fault in outdoor sensor. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5 Troubleshooting guide.	
>>>>>ERROR<<<<< UPPER TANK SENS.	Fault in upper tank sensor. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5 Troubleshooting guide.	
>>>>>ERROR<<<<< LOWER TANK SENS.	Fault in lower tank sensor. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5 Troubleshooting guide.	
>>>>>ERROR<<<<< ROOM SENSOR	Fault in room sensor. Sensor faults can be due to several different things. For troubleshooting see chapter 8.5 Troubleshooting guide.	*Only appears if room sensor is installed/activated.*

2.8 Standby texts

Standby texts work just like alarm texts and are ordered by priority. The text with the highest priority appears if it is active.

> Alarm texts take precedence over all standby texts.

Display	Explanation	Comments
COMPRESSOR OFF MENY > SYSTEM	Upon the first start-up, the compressor (and electric heaters) are blocked and settings must be made before they can be unblocked. Unblock in the system menu. See chapter 2.5.5.	
HEAT PUMP OFF OUTDOOR TMP -27°C	For ExoAir and Polaris, operation at low outdoor temperatures is restricted to -15°C and -25°C respectively. The box disappears automatically when the temperature has risen above the minimum permitted temperature.	*Displayed only if a heating pump is installed and for model ExoAir or Polaris.*
DEFROSTING 25 sek SENS 5°C	When defrost is in progress, this box appears with information about the time that has passed. The box disappears automatically when defrost is complete.	*Displayed only if a heating pump is installed and for model ExoAir or Polaris.*
POW. EL.H 7.5kW UPPER TANK 52°C	If no heating pump is installed, this box is displayed in normal mode. It indicates the current output of the electric heaters and the temperature in the upper tank section.	*Displayed only if no heating pump is installed.*
MAX TEMP HEAT PUMP REACHED	During heating pump operation to the lower part of the tank, the temperature of the heat carrier (water) from the heating pump is monitored constantly. If max temperature is achieved at the sensor, restarting is not permitted until the temperature on the lower tank sensor has fallen to ”set value lower tank” – ”hysteresis lower tank”. This box disappears automatically when restarting can take place again.	*Displayed only if a heating pump is installed.*

Display	Explanation	Comments
	When the heating pump has reached its set value, it stops and waits for a restart, which can occur no earlier than 10 minutes after a stop. The start delay is also dependent on how quickly the temperature falls in the lower tank or upper tank, and what temperature hysteresis is set in the service menu. Starting is possible only when the time delay is achieved and the temperature has fallen as per the criteria above. As long as the "STANDBY" box is filled in, the system will wait for the temperature in the upper or lower tank section to fall. This text display toggles with displaying the text box below for 3 sec.	*Displayed only if a heating pump is installed.*
	During heating pump start delay, this text is displayed periodically with the box above.	*Displayed only if a heating pump is installed.*
	The heating pump charges either the upper section (high temp section) or the lower section (low temp section). The upper section takes priority, but when the set value there is achieved, charging to the tank section which is the primary energy source for the building's radiator/underfloor heating system is permitted. The display shows the current value and the value that is to be achieved.	*Displayed only if a heating pump is installed.*
	Charging towards the upper tank section. Also see the info box above.	*Displayed only if a heating pump is installed.*

3 INSTALLATION of ExoAir and Polaris

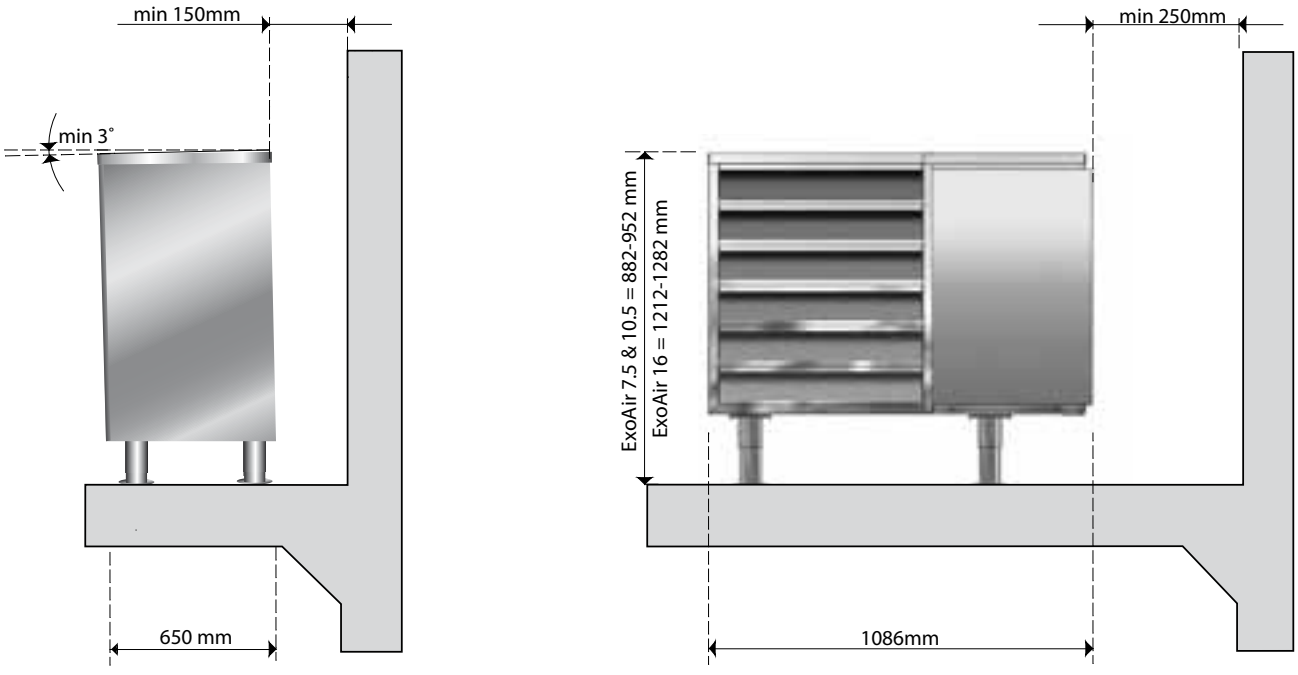
This chapter is intended for the installer of the installation. This chapter relates to the installation of the air/water heating pumps ExoAir and Polaris. When installing the liquid/water heating pump Exotic S, please see chapter 4.

- Note that the startup report must be filled in once installation is complete.

3.1 Location

- The heating pump must be located outdoors and must not be placed in a car port or outbuilding of any type. The heating pump must be free standing, with no roof or similar above it.
- Ensure that the air circulation around the heating pump is as good as possible.
  Installation near to the boiler is preferable so that pipe routing is shorter and heat losses are minimised.
- Although ExoAir and Polaris have good noise insulation, they must be positioned to minimise noise levels to neighbours and anyone inside the building. Note that asphalt, concrete, slabs, etc. make the sound resonate more easily/for longer than for example on grass, which absorbs a lot of the noise. Contact your local council for the relevant local noise regulations.
- The heating pump automatically reduces the fan speed during the summer months, depending on the cut-out temperature set in the control, which reduces noise.
- The heating pump is best placed on a firm surface, such as paving slabs, a concrete foundation or similar. Note that in some locations it may be necessary to have high foundations to cope with any heavy snowfall.
- The distance from the exterior wall to the heating pump must be at least 150mm. When positioning in a corner, the minimum distance to the end must be 250mm, see figure 7.
- During defrosting a large amount of condensation water can run off the coil, so it must be ensured that water can be filtered by a gravel bed and not cause open surfaces to become slippery. When positioning, it should also be ensured that the whole heating pump leans slightly forward to prevent water running down onto the condenser coil and causing icing problems. Set-up can be easily done by adjusting the adjustable legs.

Figure 7, Positioning of the heating pump



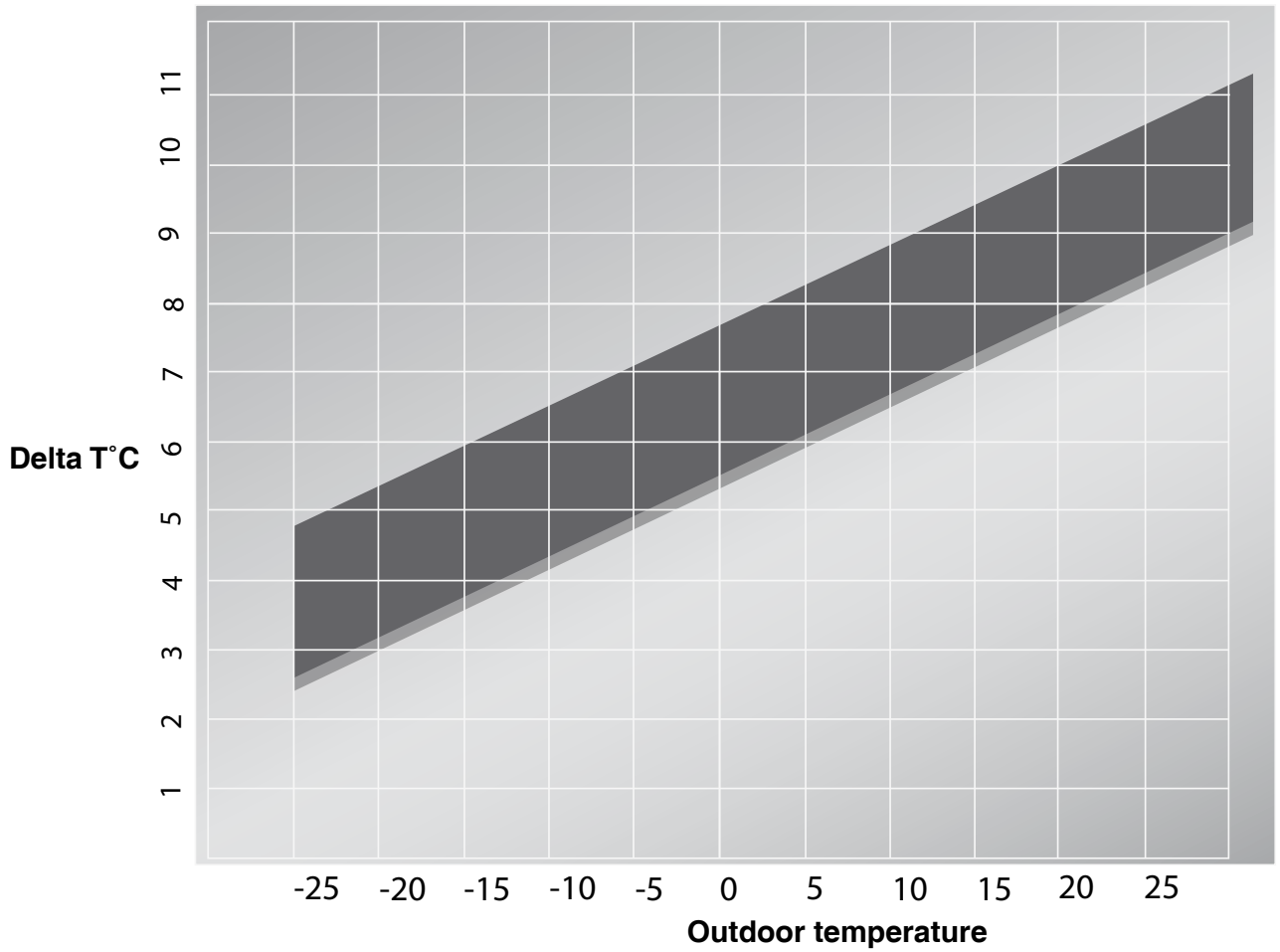
3.2 Pipe installation

The ExoTank VPX is designed to allow all pipes to be connected from above, below or from the side. For radiator pipes, tap water pipes and the return to the heating pump, only the flange couplings are undone and the pipes can be positioned at any angle and cut to the correct length. The heating pump supply line requires a certain amount of adaptation to be angled downwards. All pipes are installed pointing up at the factory and are labelled with their function and direction.

- 22mm copper pipes are routed to/from the heating pump.
- The charge pump rate must be set depending on which heating pump is installed; see table 1 on the next page. Alternatively, an additional charge pump will need to be connected. A simple check of the flow is carried out by measuring the temperature difference between the supply line and the return for the heating pump. Depending on the water temperature and outdoor temperature, the temperature difference should be as shown in diagram 6 below.

Note: Measurement must take place when the heating pump is charging the lower part of the tank. When charging the upper tank, the flow is regulated via a control valve, which gives a higher ΔT than during lower tank operation.

Diagram 6. Recommended temperature difference when charging to lower tank for ExoAir and Polaris at various outdoor temperatures.



- The charge pump rate in its basic version is as shown in table 1 below.

Table 1. Pipe dimensions, charge pump and pressure drop condenser

Model	Pipe dimension	Charge pump	Charge pump rate	Nominal flow	Pressure drop, condenser
ExoAir 7.5	22mm	Wilo RS25/6	2	900l/h	14kPa
ExoAir 10.5	22mm	Wilo RS25/6	3	1200l/h	26kPa
Polaris 10	22mm	Wilo RS25/6	3	1100l/h	5kPa

- A braided hose is connected between the connection pipe and the heating pump's connection to prevent vibrations/ noise being transferred to the radiator system in the house.
- Note the direction of connection of the connecting pipes/hoses on the heating pump. The direction is indicated in the form of an image (according to figure 8) on the side of the condenser.
- Outdoor pipes/hoses should be insulated with at least 15mm thick armaflex or similar insulation. The insulation must be moisture resistant and not be affected by moisture from outside. Indoor pipes/hoses must be insulated with at least 8 mm thick insulation.
- Pipework must be carried out in such a way that the system is as self-venting as possible. There is a bleed valve at the highest point on the condenser in the heating pump. Bleed valves are necessary if pipes are routed above these bleed valves.

Figure 8. Direction of water connection on heating pump.

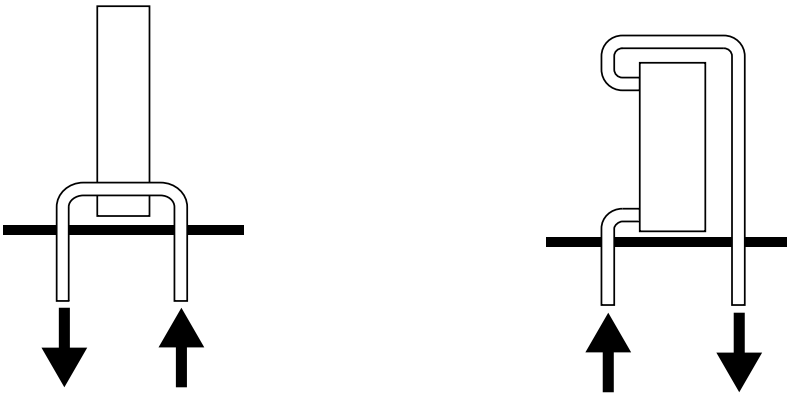


Figure 9. Flow switch, tap water.

- The connection for the expansion tank is centred in the top of the tank, connection 1" int. (DN25). The volume of the expansion tank should not be below 5% of the total system volume (boiler + radiator system). If a solar collector or solid fuel is to be connected, the expansion tank should be dimensioned to approx. 10% of the system volume. A safety valve with a max. opening pressure of 1.5bar must be installed.
- When connecting a tap water pipe, note that the cold water pipe is fitted with a flow switch which has to be handled carefully. If the pipe/pipes is/are to be turned downwards and the switch undone, it is necessary to ensure that the switch is fitted with the arrow in the direction of flow. A safety valve with a max. opening pressure of 9bar must be installed on the incoming cold water pipe on the boiler.
- **Note:** There is a bleed valve on the heat exchanger in the boiler, mounted on the innermost pipe to the left. This valve is used to bleed the exchanger.
- Installation of solar heating or another external energy source takes place on connecting sleeves on the lower or upper part of the tank, 3/4" ext. (DN20).
- A circulation pump for the heating system must be installed on the supply pipe labelled RAD with arrows from the boiler. The circulation pump is connected electrically in ExoTank VPX. See also chapter 5 ***Electrical installation***.

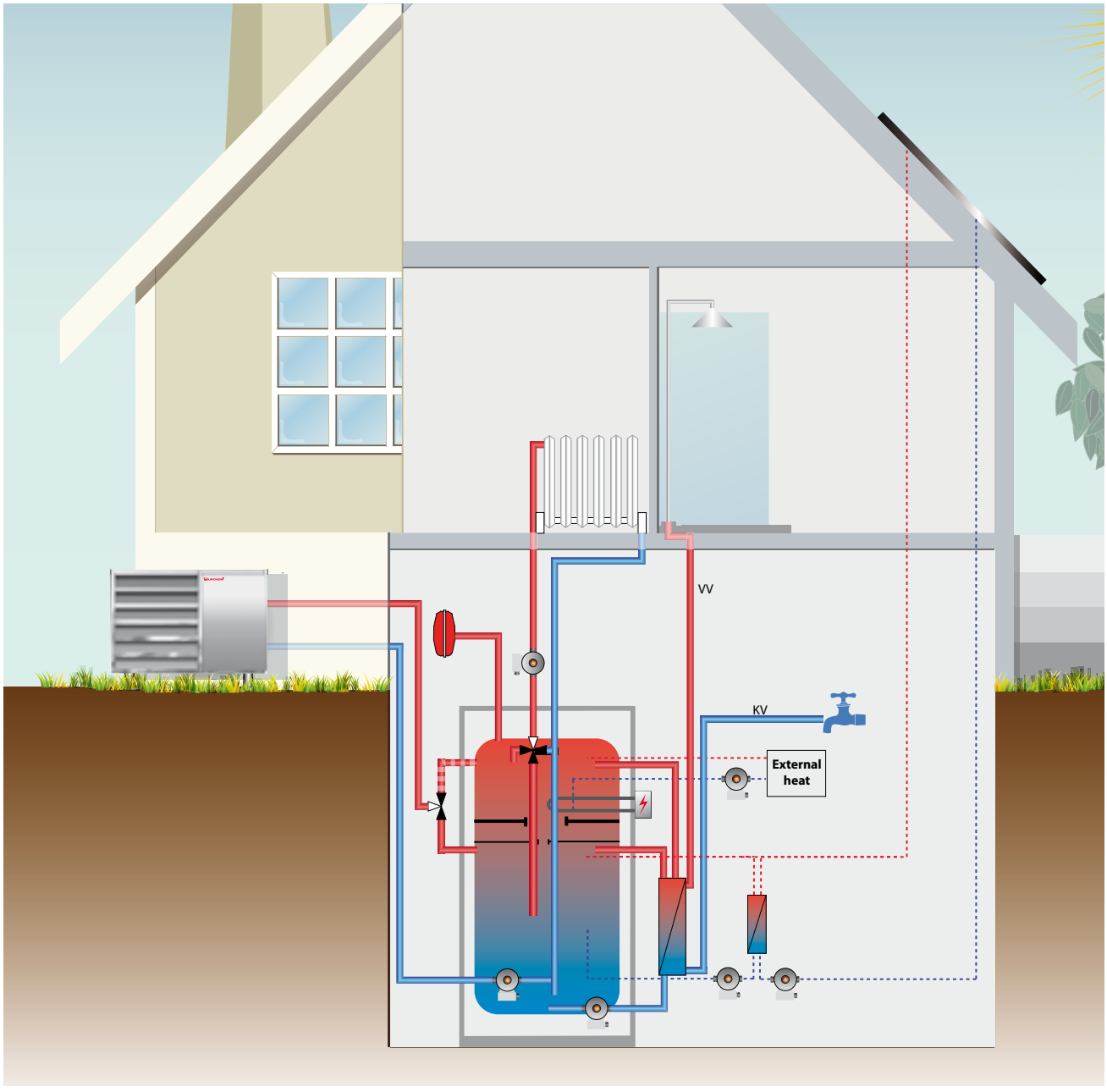
3.3 System description

Figure 10 below shows a diagrammatic installation schedule for ExoTank VPX with ExoAir or Polaris.

In general, the system operates as follows:
The heating pump works either with the lower part (low temp section) of the tank or with the upper part (high temp section). The high temp section always has priority in order to maintain good levels of hot water comfort. Prioritisation takes place automatically and means that the integral reverse valve opens for charging to the high temp section. The valve continuously regulates the flow through the heating pump so that it can always supply water at temperatures of at least 55ºC irrespective of the water temperature to the heating pump. This means that the integral electric heater needs to be used only in the case of discharge tappings or where the power requirement for the building exceeds the output of the heating pump.
The bivalent shunt valve for the radiator system ensures that the low temp section is used in the first instance for heating the building.

Tap water production takes place via the integrated heat exchanger, which primarily (approx 65%) uses the low temp section's energy to produce hot water. Circulation of the heating water through the exchanger is controlled via the flow switch and the integrated circulation pump.
The ExoTank VPX is easy to supplement with solar heating via connections in the low temp section or to a high temperature source on the upper connections.

Figure 10. System description.



4 INSTALLATION of Exotic S

This chapter is intended for the installer of the installation. This chapter relates to the installation of Exotic S. When installing the air/water heating pumps ExoAir and Polaris, please see chapter 3.

4.1 Location

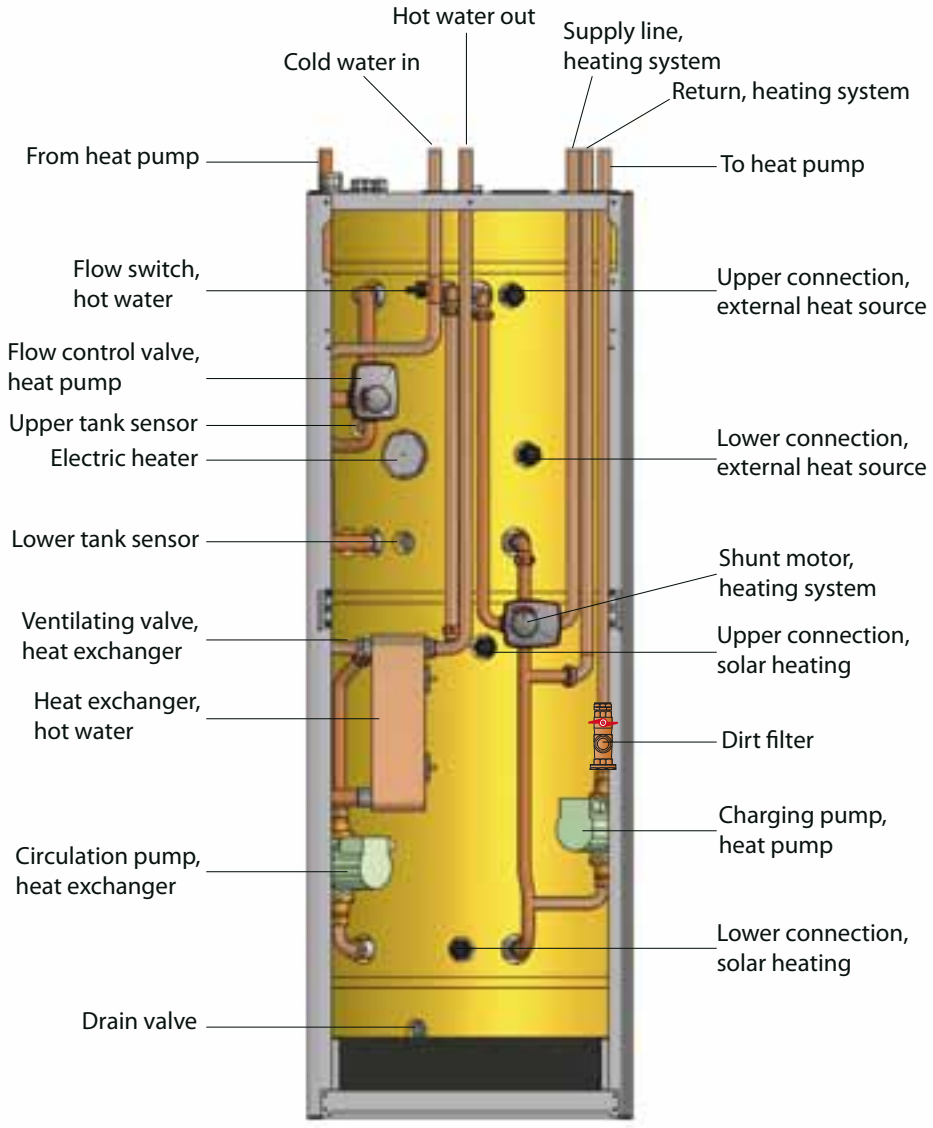
- Exotic S must be positioned indoors on a fixed base, preferably on a concrete floor. To prevent unnecessary noise, position the heating pump with its back against an outer wall, if possible.

- If possible, avoid placing close to bedrooms or other noise sensitive areas.

4.2 Pipe installation

The ExoTank VPX is designed to allow all pipes to be connected from above, below or from the side. For radiator pipes, tap water pipes and the return to the heating pump, only the flange couplings are undone and the pipes can be positioned at any angle and cut to the correct length. The heating pump supply line requires a certain amount of adaptation to be angled downwards. All pipes are installed pointing up at the factory and are labelled with their function and direction.

Figure 11. ExoTank VPX, open with visible pipes.



- 22mm copper pipes are routed to/from the heating pump.
- Circulation pump to heating pump (charge pump) is integrated in the heating pump and set at the factory (Exotic S only). The charge pump integrated in the boiler is not used. In the case of pipe lengths in excess of 25m and/or with lots of angle joints, the pressure drop should be noted and the charge pump rate adjusted where required. Alternatively, an additional charge pump will need to be connected. A single control flow is performed by measuring the temperature difference between the heating pump supply line and return. At a brine temperature of approx. 0ºC the temperature difference should between 6 and 8ºC.
- A braided hose is connected between the connection pipe and the heating pump's connection to prevent vibrations/ noise being transferred to the radiator system in the house.
- Note the direction of connection of the connecting pipes/hoses on the heating pump. The direction is indicated on the tiop of the heating pump.
- Insulation at least 8mm thick should be used.
- A connection for the expansion tank is centred on the top of the boiler, connection 1" int. (DN25). The volume of the expansion tank should not be below 5% of the total system volume (boiler + radiator system). If a solar collector or solid fuel is to be connected, the expansion tank should be dimensioned to approx. 10% of the system volume. A safety valve with a max. opening pressure of 1.5bar must be installed.
- When connecting a tap water pipe, note that the hot water pipe is fitted with a flow switch which must be handled carefully. If the pipe/pipes is/are to be turned downwards and the switch undone, make sure that the switch is fitted in exactly the same way. A safety valve with a max. opening pressure of 9bar must be installed on the incoming cold water pipe on the boiler.
- Installation of solar heating or another external energy source takes place on connecting sleeves on the lower or upper part of the tank, 3/4" ext. (DN20).

Table 2. Pipe dimensions, charge pump and pressure drop condenser

Model	Pipe dimension	Charge pump	Charge pump rate	Nominal flow	Pressure drop, condenser
Exotic S 8	22mm	Wilo RS25/6	2	900l/h	3kPa
Exotic S 12	22mm	Wilo RS25/6	3	1350l/h	3kPa

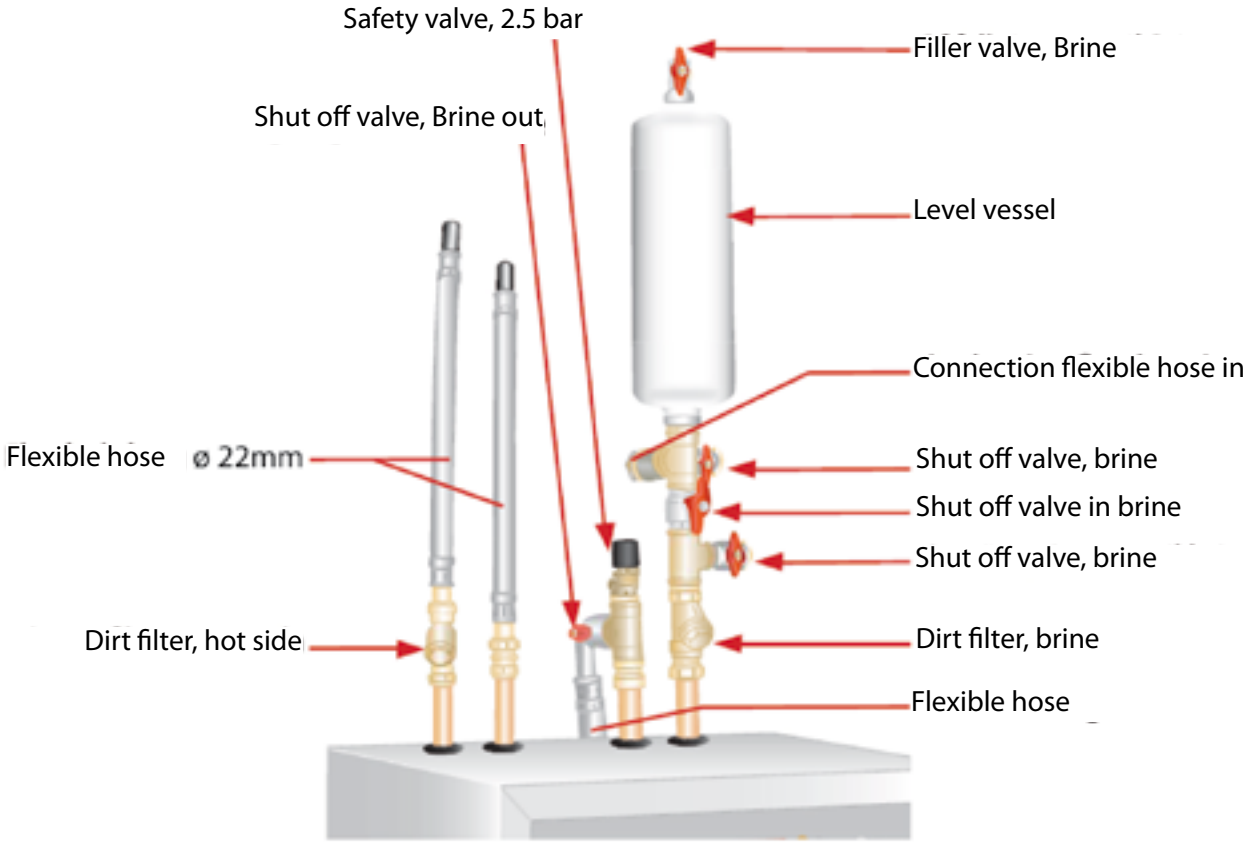
4.2.1 Brine

- The collector for ground/rock/ground water/lake heat, etc. must be dimensioned according to the calculation program using a computer.
- Ground heat collectors must be positioned in such a way that self-venting can occur without air pockets. If this is not possible, the highest points must be supplied with bleed valves.
- Indoor brine lines must be insulated with moisture inhibiting material to prevent moisture from condensation.
- The brine must contain freezing point depression liquids, for example bioethanol, so that it can maintain a fluid state down to -15ºC.
- Note that if the collector is placed close to water lines or foundation, extra insulation is required to prevent freezing or channelling.
- Collector hose PEM 40 x 2.4 PN 6.3 is normally used. Each metre of hose holds approx. 1 litre of fluid.
- The pipes must be insulated when routed through walls.
- The expansion or level vessel must be positioned at the highest point in the system, as per figure 12.
- Shut off valves, filler valves and filter must be installed as per figure 12.

Table 3. Brine pump and pressure drop evaporator.

Model	Brine pump	Brine pump rate	Nominal flow	Pressure drop evaporator
Exotic S 8	Wilo Top S25/7	3	1800l/h	22kPa
Exotic S 12	Wilo Top S25/10	3	2600l/h	19kPa

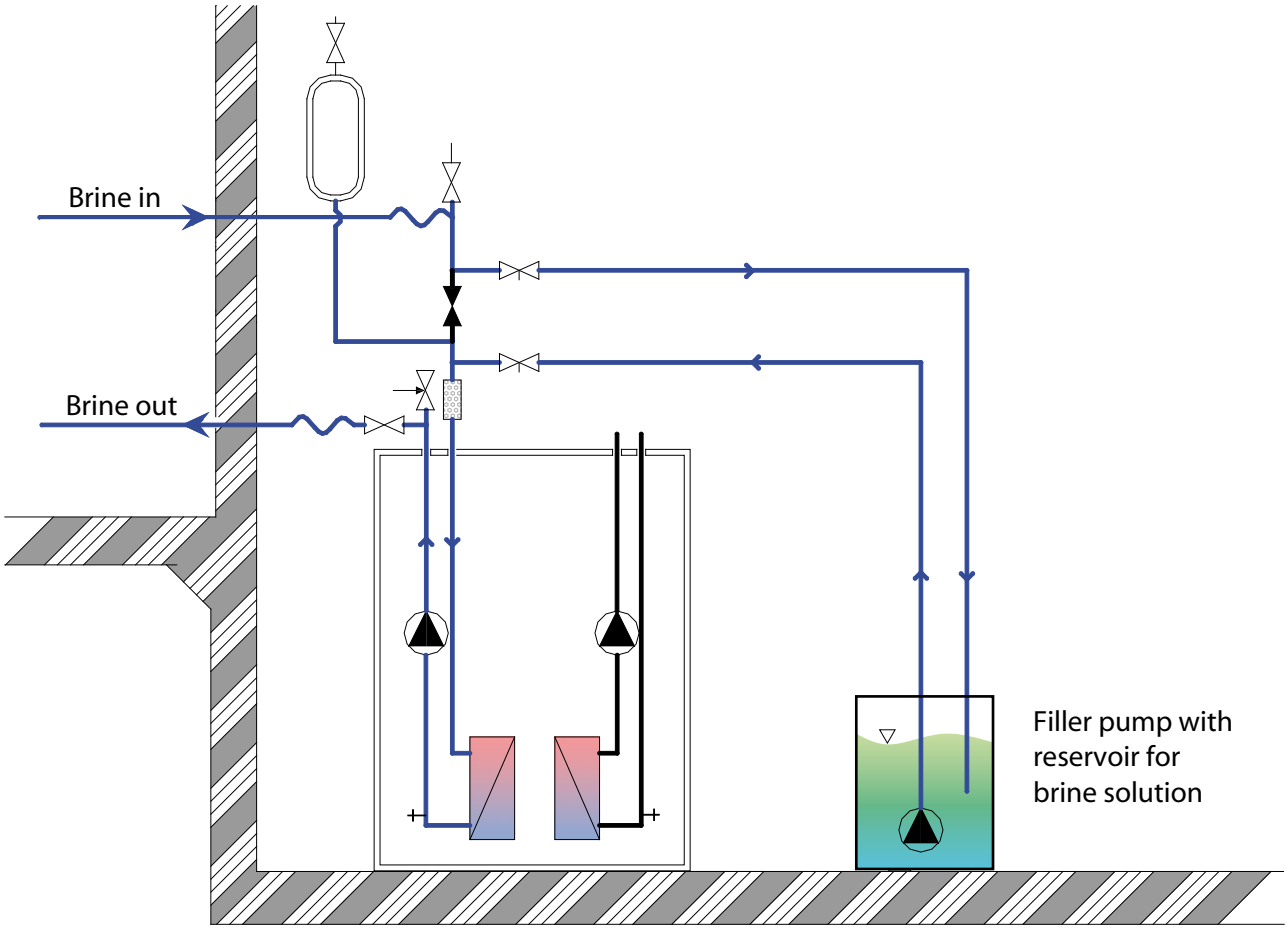
Figure 12. Connection Exotic S.



4.2.2 Filling with brine

- Fill the brine system as per figure 13, see below.
- Connect the suction hose to ”Shut off valve brine” and the pressure hose to ”Shut off valve brine”.
- ”Shut off valve in brine” must be closed during filling.
- The brine circulates until it is completely clear (not ”milky”) when it returns from the collector.
- Circulation should occur for at least one night for a smaller system.

Figure 13. Filling of brine.



4.3 System description

Figure 14 below shows a diagrammatic installation schedule for ExoTank VPX with Exotic S.

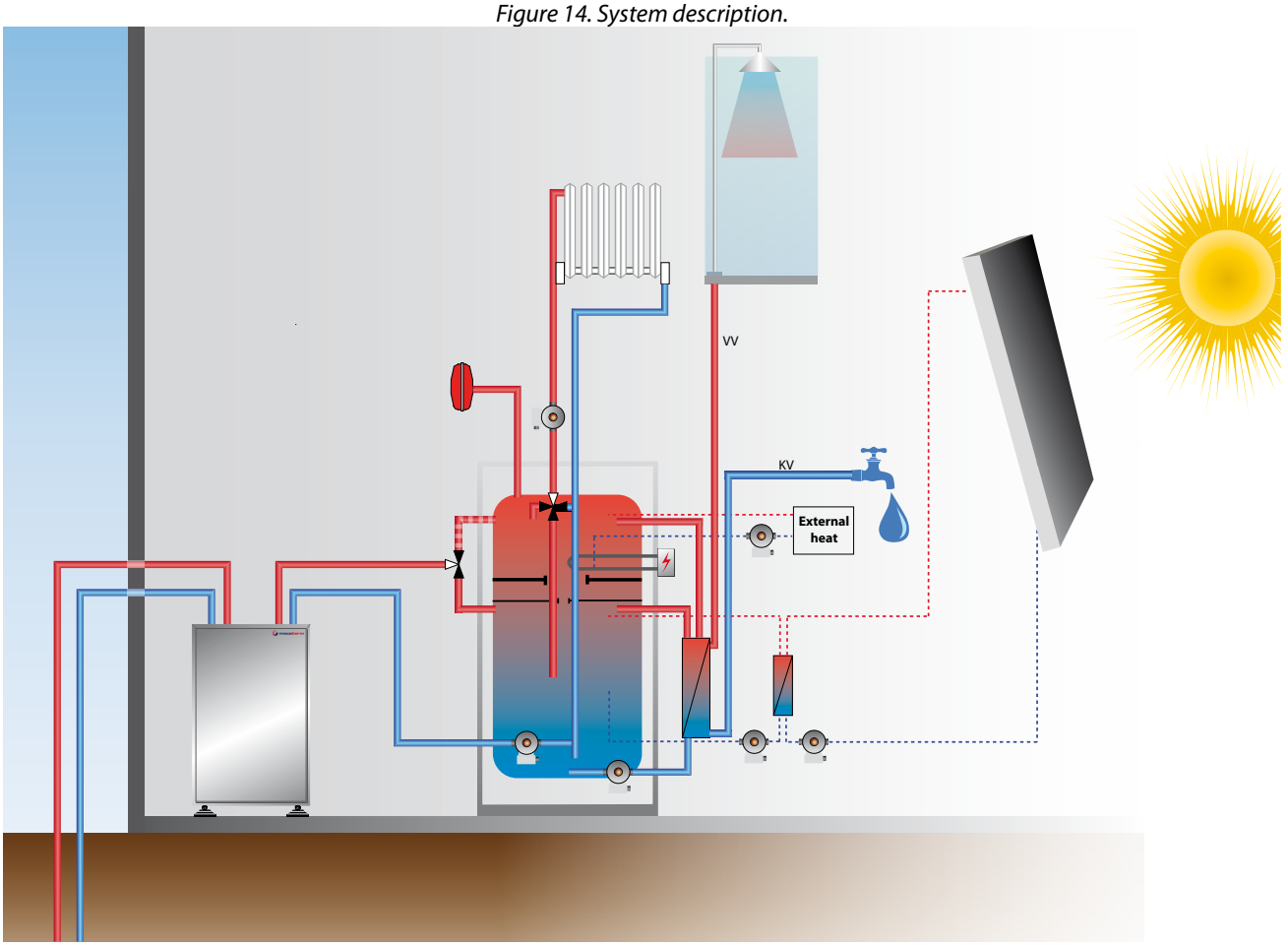
In general, the system operates as follows:
The heating pump works either with the lower part (low temp section) of the tank or with the upper part (high temp section). The high temp section always has priority in order to maintain good levels of hot water comfort. Prioritisation takes place automatically and means that the integral reverse valve opens for charging to the high temp section. The valve continuously regulates the flow through the heating pump so that it can always supply water at temperatures of at least 55ºC irrespective of the water temperature to the heating pump. This means that the integral electric heater needs to be used only in the case of discharge tappings or where the power requirement for the building exceeds the output of the heating pump.

The bivalent shunt valve for the radiator system ensures that the low temp section is used in the first instance for heating the building.

Tap water production takes place via the integrated heat exchanger, which primarily (approx 65%) uses the low temp section's energy to produce hot water. Circulation of the heating water through the exchanger is controlled via the flow switch and the integrated circulation pump.

The ExoTank VPX is easy to supplement with solar heating via connections in the low temp section or to a high temperature source on the upper connections.

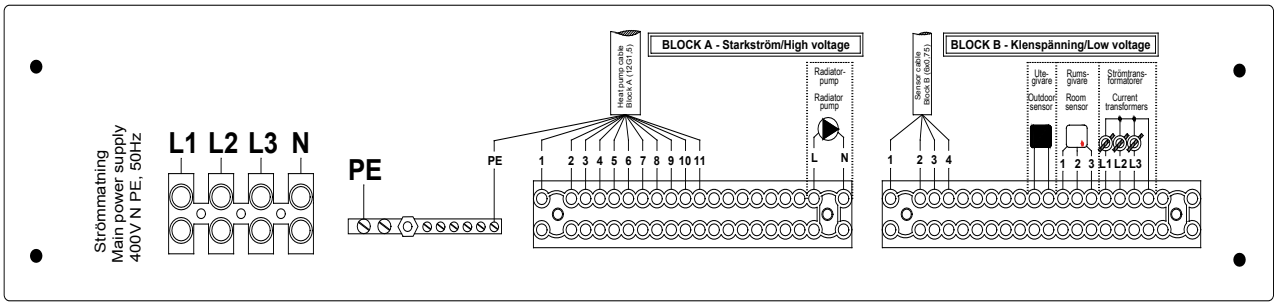
Figure 14. System description.



5 Electrical installation

Electrical connections must be carried out by an authorised electrician and according to the applicable regulations. The connection unit is made accessible by removing the upper hatch and looks as shown in figure 15 below.

Figure 15. block connections.



5.1 Feed

The maximum fuse for the feed is 25A. Power consumption will vary depending on the heating pump model and electric output connected. Table 4 below provides an estimate of power consumption at various electric output stages connected. The connected output can be limited in the software, or else power transformer are connected which automatically deal with connection/disconnection in order to prevent tripping of main fuses. The phase sequence must be followed in order to prevent the compressor going backwards.

Table 4. Total power consumption for system at different electric output stages.

Power consumption per max loaded phase at different power stages (A)

Electric heater output	1.5kW	3kW	4.5kW	6kW	7.5kW	9kW	10.5kW
ExoAir 7.5	11.5	11.5	11.5	13.7	20.2	20.2	20.2
ExoAir 10.5	14.5	14.5	14.5	16.7	23.2	23.2	23.2
Polaris 10	12.5	12.5	12.5	14.7	21.2	21.2	21.2
Exotic S 8	11.5	11.5	11.5	13.7	20.2	20.2	20.2
Exotic S 12	14.5	14.5	14.5	16.7	23.2	23.2	23.2

5.2 Connections, heating pump

If a heating pump is to be installed, there are two prefabricated cables included with the heating pump with quick-release connectors at one end. These cables are labelled ”Heating pump / Block A” and ”Sensor / Block B”

The cables are mounted with cable unions on a mounting plate, which is installed in the heating pump. The quick-release connectors are unique and cannot be connected incorrectly in the heating pump.

The cables are numbered and must be installed according to the numbers in the control box on block A and block B.

There is a connection diagram in the control unit which, together with the explanations below, can be used for electrical/ sensor installation.

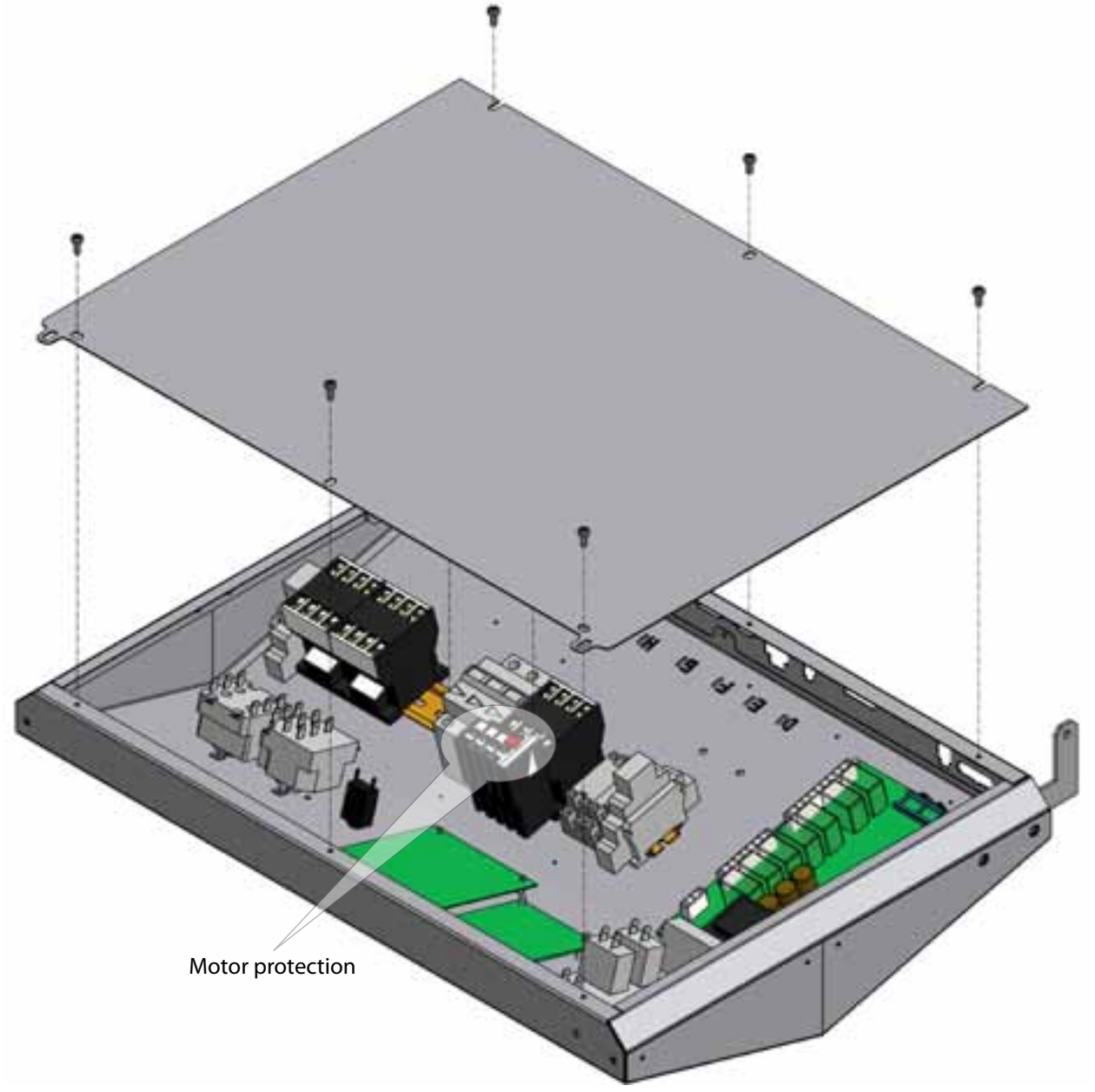
5.3 Motor protection setting

The protective plate for the controls must be undone to be able to set the motor protection, see figure 16. Motor protection must be set according to table 5 below.

Table 5. Motor protection setting

Model	Setting motor protection
ExoAir 7.5	5,2
ExoAir 10.5	8,2
Polaris 10	6.0
Exotic S 8	5,2
Exotic S 12	8,2

Figure 16. Installation of motor protection.



5.4 Block A - high current

Block A, high current connections, includes inputs/outputs for the heating pump's function and a connection for a radiator pump, see table 6 below.
The cable labelled "Block A" which is supplied with the heating pump is connected according to cable numbers on nos. 1-11.
The radiator pump has a 5A fuse are remains constantly in operation.

Table 6. Function description, block A

Block number	Cable number	Function
A1	1	Compressor, L1
A2	2	Compressor, L2
A3	3	Compressor, L3
A4	4	Pressostat HP/LP, NC 230V
A5	5	Pressostat HP/LP, NC 230V
A6	6	Low speed fan, L1
A7	7	High speed fan, L1
A8	8	Reset 4-way valve / EVI valve or brine pump / charge pump Exotic
A9	9	4-way valve or brine pump Exotic
A10	10	EVI valve or charge pump Exotic
A11	11	Reset fan
A19	-	Radiator pump, phase
A20	-	Radiator pump, reset

5.5 Block B – low current

Block B contains all low current connections for the heating pump. To prevent interference, the low current wiring must be routed away from the high current wiring. The cable labelled "Block B" which is supplied with the heating pump is connected according to the cable numbers on nos. 1-4.

Table 7. Connection, block B

Block number	Cable number	Function
B1	1	Defrost sensor or brine sensor Exotic
B2	2	Hot gas sensor
B3	3	Gem. return cable sensor heating pump
B4	4	Heating pump sensor (supply line temperature)

5.5.1 Outdoor sensor

Outdoor sensor is connected to blocks numbered B10 and B11.

Route the sensor with a minimum 0.5mm^2 cable (ideally paired) and install on the north or north west side of the house to prevent exposure to the morning sun.

Place the sensor approx. 2/3 of the way up the facade of the building and install out of direct sunlight.
Ensure that the sensor is not affected by the ventilation ducts, doors, windows or other apertures which can affect the temperature reading.

5.5.2 Room sensor

The task of the room sensor is to relay information about the room temperature to regulate the house curve. It is not necessary to use the room sensor function (disabled in the customer menu in the program), but installation should take place when alarm indication is integrated in the room sensor.

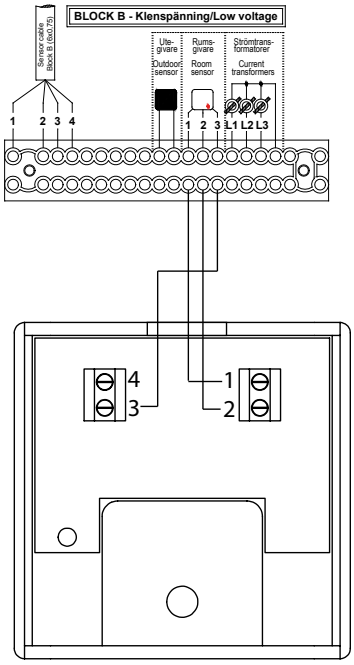
For optimum room sensor functionality, the sensor must be placed in as central and open a space as possible in the house.

We do not recommend placing the sensor by a window, radiator or similar. Install approx. 2/3 of the way up the wall and so that it can be repositioned if necessary.

The room sensor blocks are marked (1-4) and must be connected as per figure 17 on the right.

NOTE: **Terminal no. 4 is not connected!**

Figure 17. Connection of room sensor.

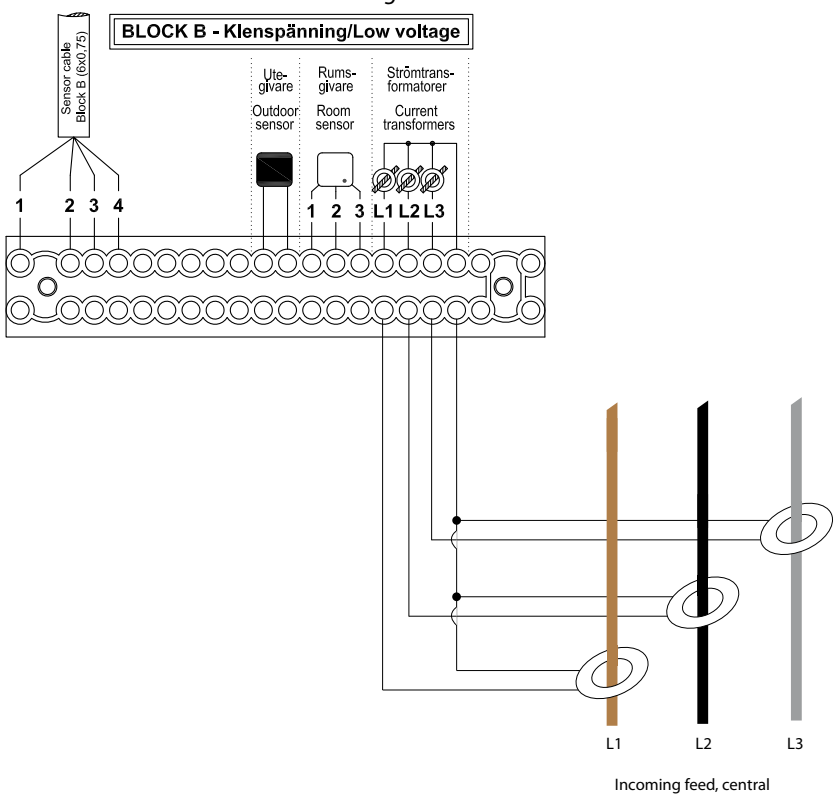


5.5.3 power transformers

power transformers are installed where there is a risk of the main fuses tripping for the facility due to overloading.
These power transformers constantly measure the group or the power consumption of the main distribution box and disconnect or prevent connection of further electric heater stages, depending on the load in question.

The power transformers are installed on incoming phases on the group/main distribution box which are to be protected from overcurrent. See figure 18 below.

Figure 18.



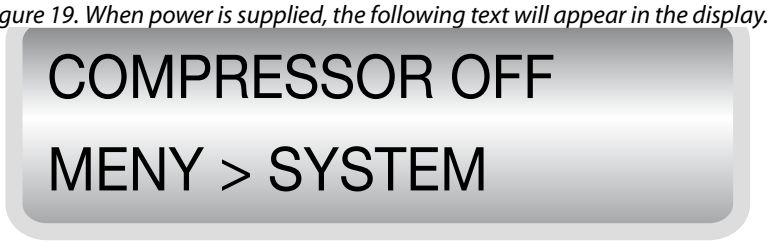
6 Checklist prior to startup

This check list is used to ensure that no installation steps are missed.

6.1 ExoAir & Polaris

- Direction of connection heating medium correct as per figure 8.
- Ensure that the system is properly vented, and that the operating pressure is at least 1 bar.
- Power supply to the control unit is correctly fused as per table 4.
- Motor protection correctly set as per table 5.
- Outdoor sensor and room sensor installed correctly as per figure 17.
- When installation is complete and the control cabinet is powered for the first time, settings must be made that are suitable for the installation.

Figure 19. When power is supplied, the following text will appear in the display.



The compressor will be blocked and prevent operation until settings are made in the system menu.

This menu is used to define settings for any heating pump model, main fuse, electric heater output, etc.

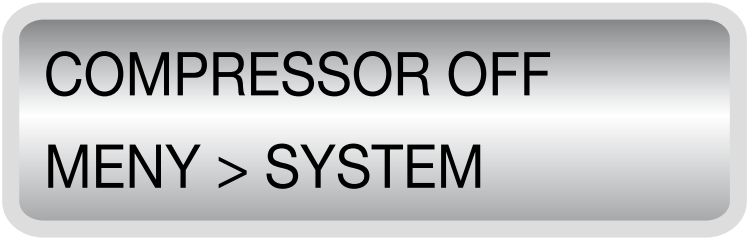
Go to chapter 2.5.5 for further information about settings in the system menu.

6.2 Exotic S

Direction of connection heating medium correct as per label on the heating pump.

- Direction of connection brine correct as per label on the heating pump.
- Direction of connection brine correct as per label on the heating pump.
- Ensure that the system is properly vented, and that the operating pressure is at least 1bar.
- Power supply to the control unit is correctly fused as per table 4.
- Motor protection correctly set as per table 5.
- Outdoor sensor and room sensor installed correctly as per figure 16.
- When installation is complete and the control cabinet is powered for the first time, settings must be made that are suitable for the installation.

Figure 20. When power is supplied, the text will appear in the display.



The compressor will be blocked and prevent operation until settings are made in the system menu.

Settings are defined in the menu for any heating pump model, main fuse, electric heater output, etc.

Go to chapter 2.5.5 for further information about settings in the system menu.

7 Maintenance and checks

ExoAir and Polaris

- During the colder months of the year, ice can build up under the heating pump. This is completely normal and need not be remedied.
- When defrosting, the evaporator/cooling battery is heated up, and when defrosting is stopped and the pump returns to normal heating operation, hot, damp air is blown out initially, resulting in formation of a white cloud of steam. This is completely normal.
- Check that the air can pass the heating pump without any obstruction, such as leaves etc.
- The heating pump should be flushed and cleaned externally 1-2 times/year.
- In exceptional circumstances a thin film may appear on the stainless steel. If this happens, there are special detergents for stainless steel, e.g. Avesta Original Finish – Rust Remover.

Figure 21. Avesta Original Finish.

- Check annually that the sight glass in the heating pump is clean, without bubbles, when the heating pump is running. If there are bubbles, this can indicate a lack of refrigerant and service should be contacted.
- Condensation run-off usually soaks away into the ground and is absorbed by the house drainage. Check that there is no moisture penetration.

Exotic S

- Check annually that the sight glass in the heating pump is clean, without bubbles, when the heating pump is running. If there are bubbles, this can indicate a lack of refrigerant and service should be contacted.
- Wipe the heating pump if necessary; if residue due to water leaks is detected, detergent can be used as above to regain a fine finish.

8 Service

This chapter is intended to be used by service technicians and/or installers as an information document and for use during installation troubleshooting.

8.1 Technical data

8.1.1 ExoTank VPX

Table 8.

Volume	278l (178+100)
Dimensions wxhxd	600x1725x790
Weight	195kg
Insulation	35mm polyurethane
Chassis	Stainless metal
Operation just as electric boiler	Yes
Max. output electric heater	10.5kW
Power stage electric heater	1.5kW
Load monitor	Yes, integral
Auxiliary thermostat	Yes
Heat shunting	BIV shunt valve
Heating pump charging	Lower + upper section via flow valve
Hot water preparation	Flat heat exchanger (40+20)
Connection radiator pipe	Top, bottom or side
Connection tap water pipe	Top, bottom or side
Connection HP	Top, bottom or side
Connection solar heating	Yes, lower section
Connection external heat source	Yes, upper section
Charge pump integrated	Yes

8.1.2 ExoAir & Polaris

Table 9.

Model	ExoAir 7.5	ExoAir 10.5	Polaris 10
Refrigerant	R407C		R404A
Amount of refrigerant	1665g	2100g	2400g
Dimensions (wxhxd)	1086x(882-952)x600	1086x(882-952)x600	1086x(882-952)x600
Weight	130kg	135kg	135kg
Power supply	400V N PE, 50Hz		
Fuse HPB300	25A		
Motor protection	5,2A	8,2A	6,0A
Soft start relay	Standard		
Compressor	Scroll		
High pressure pressostat	29bar, diff -6bar		31bar, diff –6bar
Low pressure pressostat	0bar, diff +0.9bar		
Conn. heating medium	ø22		
Normal flow	900l/h	1200l/h	1100l/h
Pressure drop, condenser	14kPa	26kPa	5kPa
Defrost system	Time and temperature dependent hot gas defrost		
Lowest outdoor temp, operation	-15°C		-25°C
Heating output/input	7.71 / 2.54kW	10.35 / 3.53kW	9.89 / 3.37kW

8.1.3 Exotic S

Table 10.

Model	Exotic S 8	Exotic S 12
Refrigerant	R407C	
Amount of refrigerant	1550g	1630g
Dimensions (wxhxd)	598x(885-920)x650	
Weight	111kg	129kg
Power supply	400V N PE, 50Hz	
Motor protection	5,2A	8,2A
Soft start relay	Standard	
Compressor	Scroll	
High pressure pressostat	29bar, diff -6bar	
Low pressure pressostat	0bar, diff +0.9bar	
Conn. heating medium	ø22	
Conn. brine	ø28	
Normal flow heating medium	900l/h	1350l/h
Pressure drop, condenser	3kPa	
Normal flow brine	1800l/h	2600l/h
Pressure drop evaporator	22kPa	19kPa
Heating output/input	7.40 / 2.25kW	10.80 / 3.26kW

8.2 Sensor resistances

Table 11. Temperature-resistance conversion table

All sensors except hot gas sensor	
Temperature	Resistance
-20ºC	16.3kΩ
-15ºC	12.6kΩ
-10ºC	10.0kΩ
-5ºC	7.8kΩ
0ºC	6.2kΩ
5ºC	4.9kΩ
10ºC	4.0kΩ
15ºC	3.2kΩ
20ºC	2.6kΩ
25ºC	2.2kΩ
30ºC	1.8kΩ
35ºC	1.5kΩ
40ºC	1.2kΩ
45ºC	1.0kΩ
50ºC	0.8kΩ
55ºC	0.7kΩ

Hot gas sensor	
Temperature	Resistance
0ºC	163kΩ
10ºC	95kΩ
20ºC	61kΩ
30ºC	39kΩ
40ºC	26kΩ
50ºC	18kΩ
60ºC	12kΩ
70ºC	8.5kΩ
80ºC	5.9kΩ
90ºC	4.4kΩ
100ºC	3.3kΩ
110ºC	2.5kΩ
120ºC	1.9kΩ
130ºC	1.4kΩ

8.3 Default settings and preset values

All settings in the control unit are checked prior to delivery. In some cases, it may be necessary to reset the factory settings.

> When replacing the EPROM, a reset must be performed in order for the settings to be stored.

To reset to factory settings, hold all 3 display buttons in for at least 5 seconds; when this is done, the text "BASIC SETTINGS ENABLED" is displayed.
Note that all settings have now been reset to zero and that settings for the system must be made again, as well as any adjustments of other parameters.

Table 12. Preset values.

	Parameter	Unit	Max	Min	Preset	Min setting
Times	System operational, total	h	32,000	0	0	
	Operation HP last 24h	h	24	0	0	
	Compr. start last 24h	pcs	255	0	0	
	Heating pump operational, total	h	32,000	0	0	
	Electrical operation, total	kWh	32,000	0	0	
Customer	Set value room temperature	ºC	30	10	20	
	Room sensor operation with/without	-	yes	no	yes	
	Desired temp. upper tank	ºC	70	20	55	
House curve.	Supply line rad at outdoor temp. -15ºC	ºC	80	20	55	
	Parallel-shift house curve	ºC	10	-10	0	
	Radiator heating off at outdoor temp	ºC	30	0	17	
	Minimum permitted tank temp.	ºC	HP max -5ºC	20	35	
	Summer charging at outdoor temp	ºC	5	40	15	
	Only underfloor heating yes(1) no(0)	-	1	0	0	
	Basement heating on/off	ºC	30	15	OFF	
System	Heating pump installed yes/no	-	1	0	1	
	Mod. ExoAir(0)/Polaris(1)/Exotic(2)	-	2	0	0	
	Main fuse in distribution box	A	63	10	20	
	HP compressor blocked yes(1)/no(0)	-	1	0	1	
	Electric heater blocked yes(1)/no(0)	-	1	0	1	
	Con. elec. htr. 3, 6, 7.5, 9, 10.5kW	kW	10.5	3	10.5	
Service settings	Fan speed 2 at outdoor temp.	ºC	10	-15	10	
	Temp. hysteresis HP lower tank	ºC	30	2	5	
	Temp. hysteresis HP upper tank	ºC	30	2	5	
	Delay shunt to upper tank	min	255	1	180	
	Start defrost at sensor temp,	ºC	0	-10	-4	
	Stop defrost	ºC	35	5	14	
	Freeze alarm brine fluid at temp.	ºC	0	-15	-10	
	Max temp. heating pump	ºC	60	30	55	
	Calibration hot gas sensor	ºC	+6	-6	0	
	Calibration outdoor sensor	ºC	+6	-6	0	
	Calibration room sensor	ºC	+6	-6	0	

8.4 Wiring diagram

Figure 22. Wiring diagram – Heating pump.

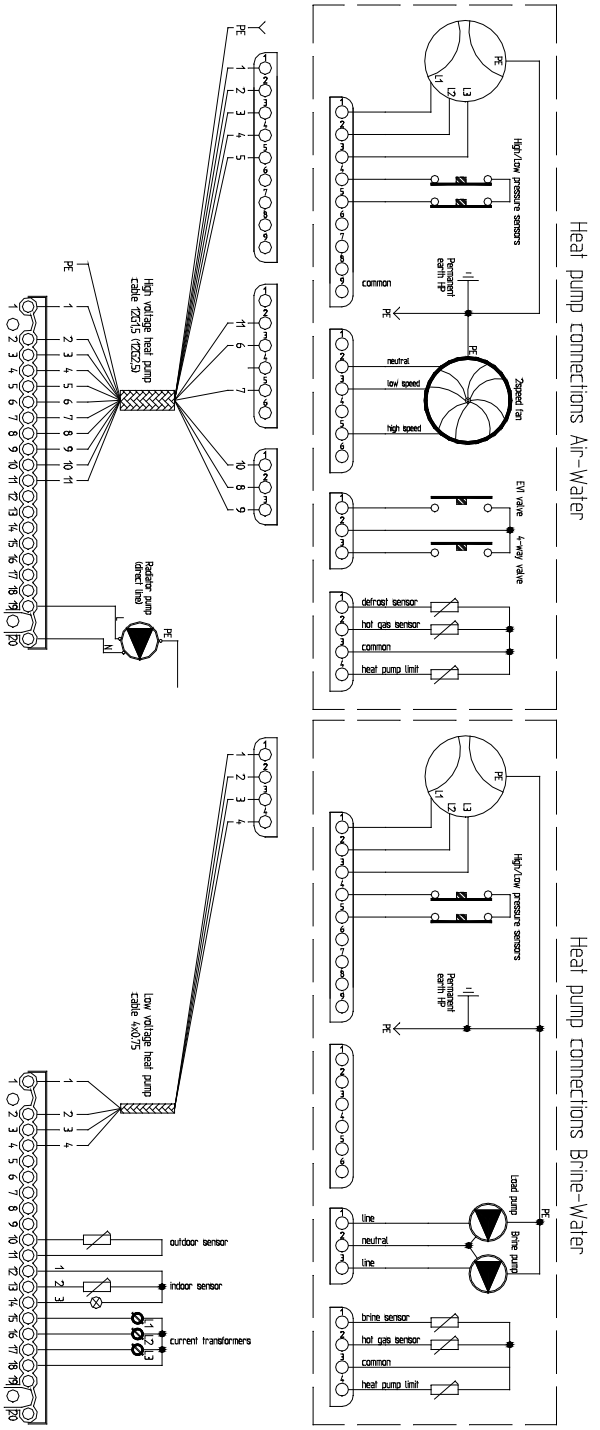
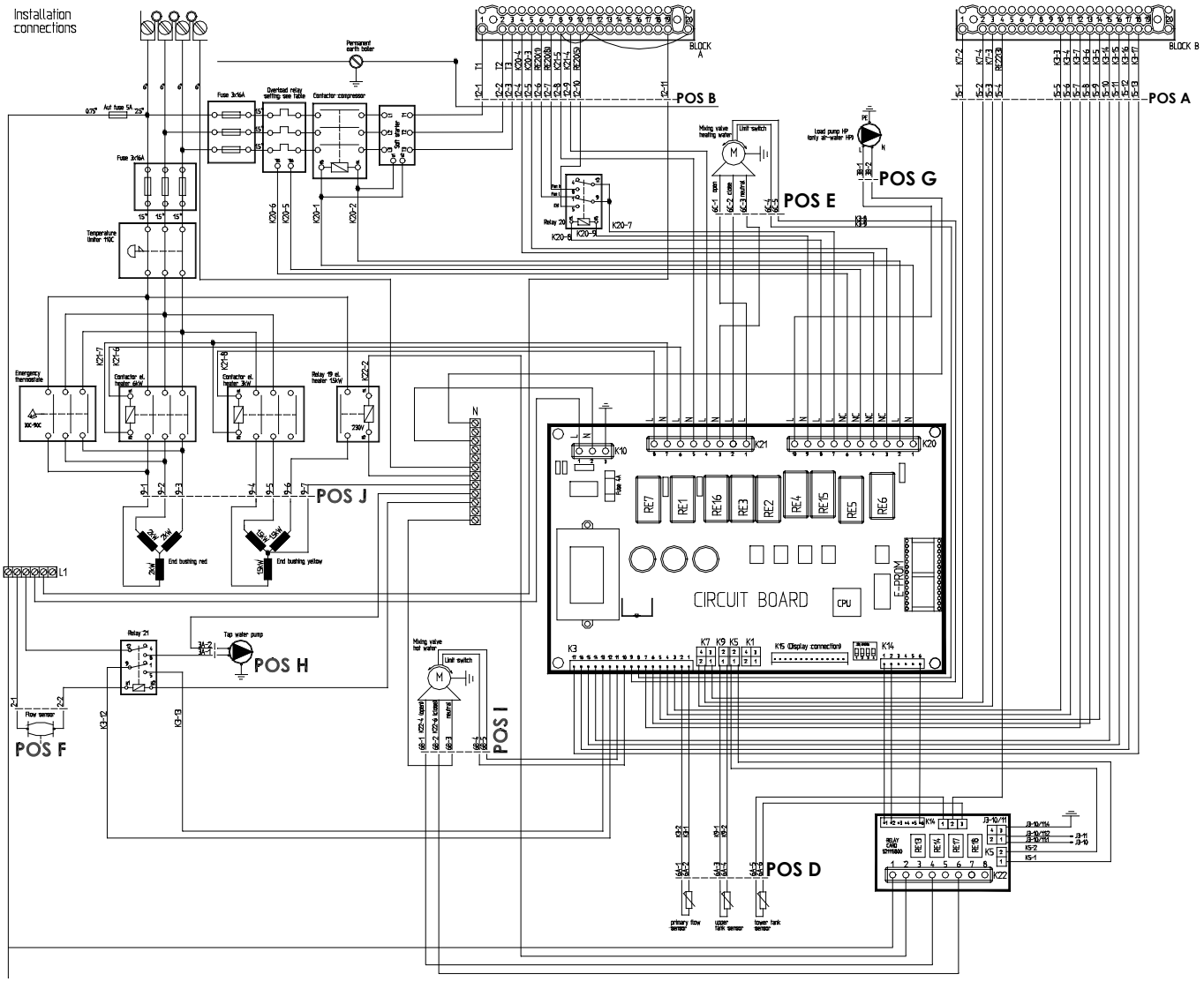


Figure 23. Wiring diagram - Boiler.



8.5 Troubleshooting guide

Type of error	Check/Action
Heating pump does not start	• Check that the compressor is not blocked in the system menu in the control unit. • Check that the time delay and/or temperature hysteresis for the compressor is not active. • Cut the current on the control cabinet and switch on again. • Test operate the compressor and other components manually in the test menu to eliminate electro mechanical errors.
Hot gas alarm	High hot gas may be due to various things and values must be checked and read off. • Check for bubbles in the sight glass. If there are bubbles, the problem may be due to a lack of refrigerant. Leak trace the installation. • (Only ExoAir and Polaris) A frozen evaporator gives low evaporator temperatures, which, together with high water temperatures, gives high hot gas. Defrost the evaporator manually until all ice has gone. Adjust any start defrosts and/or the temperature interval for the defrost in the service menu if the fault recurs. • Defective expansion valve. Check overheating. • (Only Polaris) EVI circuit not activated. Check that the solenoid valve and expansion valve for the EVI circuit are not defective. Measure supercooling and compare with table 2. The difference is measured between the condensate and the temperature just before the expansion valve to the main circuit. • Hot gas sensor. Check that the hot gas sensor shows the correct value by comparing with another temperature instrument. If sensor problems are established, first determine whether the signal is good and that the cable is properly installed in the block in the control unit. • Poor circulation on the water side. Check the temperature difference between the input and output water, must be max 10°C at approximately 15°C outdoor temperature. Check the dirt filter on the water side. • Blocked condenser. If there are high temperature differences between the input/output water and checks have been carried out as stated above, the condenser may be blocked. Action: Reverse flush the condenser. • (Only ExoAir and Polaris) Leakage 4-way valve. Measure the temperature difference on the suction gas line before and after the 4-way valve. The temperature difference must be a maximum of 4°C. If there is a greater difference, the 4-way valve is leaking internally, which means hot gas is being pressed directly into the suction port. In this case, the evaporator temperature will be higher than normal. • Internal leak compressor. If the above checks are performed and other measurement values are checked, the problem may be due to internal leakage in the compressor.

Pressostat alarm	• The heating pump has low and high pressure pressostats that are connected in series to the control unit. In the event of an alarm, it is therefore not possible to establish whether a low or high pressure pressostat has tripped. The high pressure pressostat trips, depending on model, at 31 or 29bar respectively and closes when the pressure has dropped to 25 or 23bar respectively. The low pressure pressostat trips at 0.0 bar and closes when the pressure has risen to at least 0.9bar. • To establish which pressostat has tripped/trips, a manometer must be connected and readings taken from the heating pump. **High pressure pressostat:** • Poor circulation on water side. Check the temperature difference between the input and output water, must be max 10°C at approximately 15°C outdoor temperature. Check the dirt filter on the water side and that the circulation pump is not defective. • Blocked condenser. If there are high temperature differences between the input/output water and checks have been carried out as stated above, the condenser may be blocked. Action: Reverse flush the condenser. • (Only ExoAir and Polaris) Leakage 4-way valve. Measure the temperature difference on the suction gas line before and after the 4-way valve. The temperature difference must be a maximum of 4°C. If there is a greater difference, the 4-way valve is leaking internally, which means hot gas is being pressed directly into the suction port. In this case, the evaporator temperature will be higher than normal. • Water temperature too high. Heating pump operation must be stopped at the set maximum value in the service menu. Read off the actual temperature of the water from the heating pump and compare with the sensor values in the control unit. If there is a difference, lower the maximum temperature for the heating pump in the service menu. • Defective expansion valve. Check overheating.
	• Check the difference between the condensing temperature and outgoing water temperature. Depending on the conditions, the difference should not be greater than 3°C. • Check that the high pressure pressostat does not trip before 31bar (Polaris), 29bar (ExoAir and Exotic). **Low pressure pressostat:**
	• Lack of refrigerant. (Bubbles in sight glass) Check for any leaks. • (Only ExoAir and Polaris) Frozen evaporator. Check that the 4-way valve switches. Run manual defrost. Check that the defrost sensor shows the correct value. Check that the angle of the heating pump is correct. • Defective expansion valve. Check overheating. • (Only ExoAir and Polaris) Defective check valve. Check that the temperature difference occurs during normal operation and that there is no temperature difference when the heating pump is operated in defrost mode. • (Only ExoAir and Polaris) Defective 4-way valve. Check that the valve shifts through manual operation in the test menu.

Motor protection	• Check for any phase drops. • Check that cables 1, 2 and 3 in block A in the control unit are secure in the blocks. • Check that the motor protection is properly set. The motor protection must be set as per table 5 and set to automatic mode (A). • Measure the compressor current phases for phase during operation and compare with the figures in the table. • Check the compressor windings. If possible, through inductance measurement, measure with a motor tester directly on the compressor. The measurement values must not deviate from each other. If inductance measurement is not possible, the windings can be ohm measured with a normal multimeter. The resistance between the windings depends on the model, but must be within 1.5-7Ω. • Earth fault compressor. Measure all phases to earth to check for any earth faults.
Sensor errors	• Sensor errors are most commonly caused by poor sensor cable contact. Check that the cable is properly spliced and is secure in the terminals in block B in the control unit. • Check cable routing and for any cable breaks. • Ohm read the sensors at a determined temperature and compare with table 11.

8.6 Spare parts list

Table 13. Spare parts list for ExoTank VPX.

Component	Order number
Contactor heating pump	521079900
Contactor electric heaters	521079700
Motor protection heating pump 6-9A	520512901
Soft start heating pump	521042500
Piston type fuse 16A	521080500
Relay base 2-pole	520923600
Relay 2-pole 230VAC	520923500
Relay base 1-pole	521072900
Relay 1-pole 230VAC	521073001
Charge pump/pump flat heat exchanger	521110400
Shunt valve heating system/heating pump	521003400
Shunt motor heating system (120 sec.)	521003500
Shunt motor heating pump (15 sec.)	521075400
Heat exchanger	521028600
Flow switch	521157000
Thermostat electric heater	521029700
Overheat protection electric heater	521029600
Electric heater	521029500
Fibre packing electric heater	521116100
Printed circuit board (main card)	520621300
Printed circuit board (relay card)	521115800
Display card	520621400
Outdoor sensor	520927600
Room sensor	520928600
Sensor tank, supply line	520920300
Current transformer	520922900

Table 14 Spare parts list for ExoAir & Polaris

	Order number					
Component	ExoAir 7.5	ExoAir 10.5	ExoAir 16	Polaris 10	Polaris 16	Polaris 20
Compressor	520933800	520879800	520964700	520606300	520990000	521019500
Receiver drier	520837800	520837800	520740900	520740900	520990400	520990400
Evaporator	521003100	521003100	520972500	521003100	520972500	520972500
Low pressure pressostat	521103900	521103900	521103900	521103900	521103900	52110390
High pressure pressostat	520930400	520930400	520930400	520994200	520994200	520994200
Check valve	521127300	521127300	521127300	521127300	521127300	521127300
Sight glass	520930800	520930800	520930800	520930800	520930800	520930800
Expansion valve main circuit	521083000	521083100	521083200	520994400	520994100	521089200
Expansion valve EVI circuit	-	-	-	520994000	521089100	521089300
Condenser	520879900	520894100	520972300	-	-	-
Condenser/economiser	-	-	-	521082600	521082700	521082700
Solenoid valve	-	-	-	520996200	520996200	520996200
Coil solenoid valve	-	-	-	520996300	520996300	520996300
4-way valve.	520931500	520931500	520972400	520931500	520972400	520972400
Coil 4-way valve	520884700	520884700	520884700	520884700	520884700	520884700
Fan	521087900	521087900	521087900	521087900	521087900	521087900
HP sensor/defrost sensor	520920300	520920300	520920300	520920300	520920300	520920300
Hot gas sensor	520920400	520920400	520920400	520920400	520920400	520920400

Table 15. Spare parts list for Exotic S.

	Order number		
Component	*Exotic S* 8	*Exotic S* 12	*Exotic S* 17
Compressor	520933800	520879800	520964700
Receiver drier	520837800	520837800	520740900
Evaporator	520917500	520917503	520917505
Low pressure pressostat	521103900	521103900	521103900
High pressure pressostat	520930400	520930400	520930400
Sight glass	520930800	520930800	520930800
Expansion valve	520613500	520613500	520613500
Thermo section expansion valve	520693600	520693600	520693600
Nozzle expansion valve	520693700	520693800	520693900
HP sensor/brine sensor	520920300	520920300	520920300
Hot gas sensor	520920400	520920400	520920400

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