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NIBE™ SPLIT
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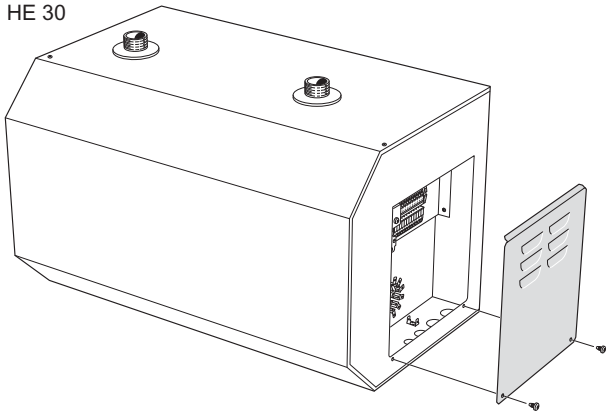
INSTALLATION AND MAINTENANCE INSTRUCTIONS

# NIBE™ SPLIT

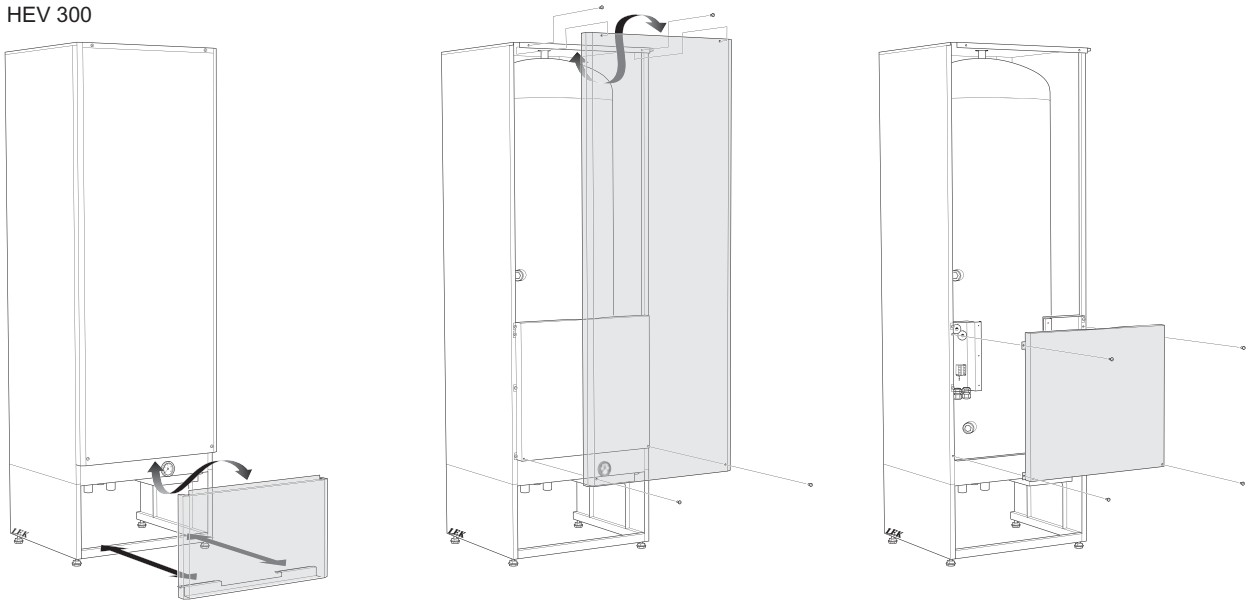
**AMS 10-16, HBS 16, HE 30/HEV 300/HEV 500**



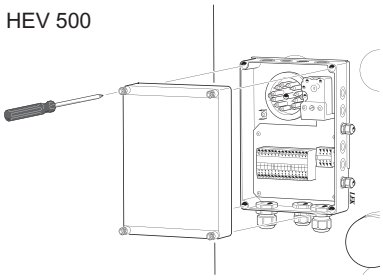
HE 30



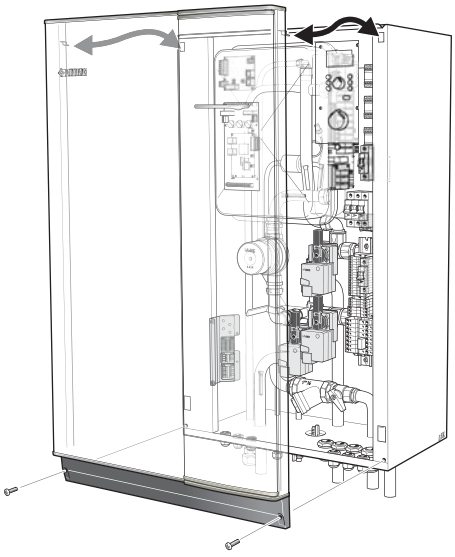
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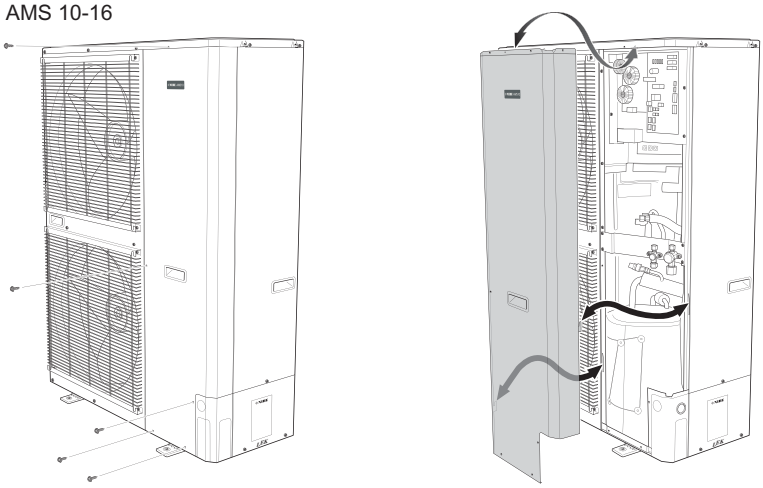
HEV 500



HBS 16



AMS 10-16



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# General

NIBE SPLIT is a system for heating, cooling and producing hot water. The system consists of an outdoor module (AMS 10-16), which utilises the energy in the outdoor air and sends it to the indoor module (HBS 16) and one of the tanks (HE 30, HEV 300, HEV 500), which takes care of the regulation and heat distribution in the house.

In order to gain the greatest benefit from the NIBE SPLIT system, please refer to the 'For Home Owners' chapter within this Installation and Maintenance Manual.

NIBE SPLIT is a quality system offering a long service life and reliable operation.

## Installation data

**Completed by the installation engineer when the system is installed**

Installation data and installation check list on page 43 must be filled in by the installer in order for the warranty to apply.

<table>
<tr><td colspan="4">The Serial number must always be stated in all correspondence with NIBE.</td></tr>
<tr><td colspan="2">Indoor unit: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _</td><td colspan="2">Outdoor unit: _ _ _ _ _ _ _ _ _ _ _ _</td></tr>
<tr><td colspan="4">Tank/Water heater: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _</td></tr>
<tr><td colspan="4">Installation date</td></tr>
<tr><td colspan="4">Check list, page 43, filled in ☐</td></tr>
<tr><td colspan="4">Installation engineers</td></tr>
<tr><td colspan="4">Heating<br>☐ Radiator ☐ Floor ☐ Fan convector<br>Cooling<br>☐ Floor ☐ Fan convector ☐ Not available ☐ Other.....<br>External heat source<br>☐ Solar ☐ Gas ☐ Oil ☐ Wood ☐ Pellets ☐ Electricity<br>Accessories<br>☐ RE 10 ☐ RG 10 ☐ ESV 22 / ESV 28 ☐ VCC 28 ☐ ACK 28 ☐ SRB 22<br>☐ Other.....</td></tr>
<tr><td colspan="4">Settings<br>Enter deviations from default settings.</td></tr>
<tr><td>Menu</td><td>Setting</td><td>Menu</td><td>Setting</td></tr>
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<tr><td colspan="4">Date _____ Signed _____</td></tr>
</table>

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
Children should be supervised to ensure that they do not play with the appliance.
Rights to make any design or technical modifications are reserved.
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# Information about the installation

## Product information

NIBE SPLIT is a complete modern heat pump system that offers effective energy saving and reduced carbon dioxide emissions. NIBE SPLIT gives safe and economical climate control.

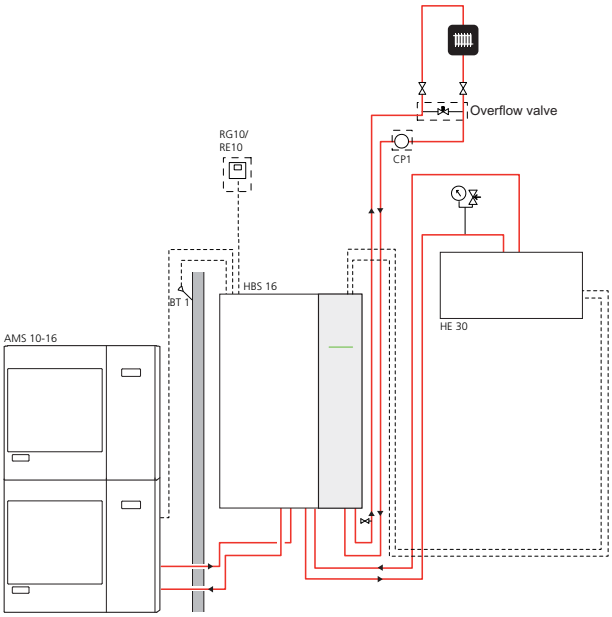
The heat is retrieved from the outdoor air through an outdoor module (AMS 10-16), where the refrigerant, which circulates in a closed system, transfers the heat from the heat source (outdoor air) to the indoor module (HBS 16). This eliminates the need for bore holes and coils in the ground.

## Features of NIBE SPLIT

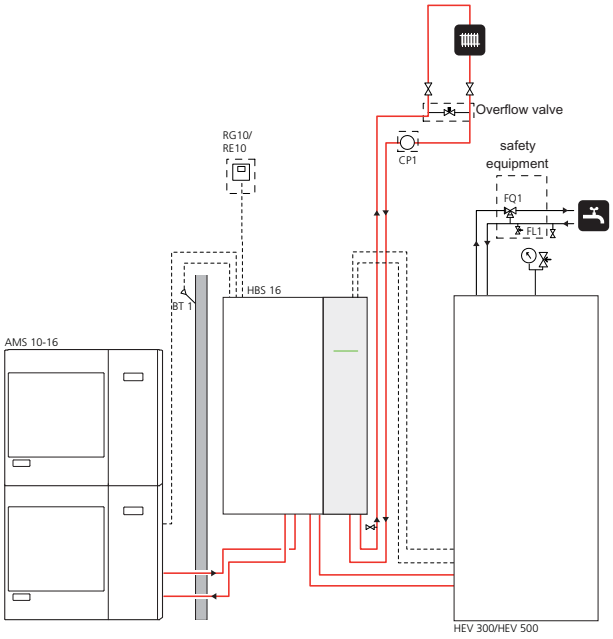
- Optimal annual heating factor thanks to the inverter controlled compressor.
- Outdoor unit with compact dimensions.
- Speed controlled circulation pump.
- Optimized operating costs. The speed of the compressor is adjusted according to the demand.
- Supplemented with tanks HE 30, HEV 300 or HEV 500 for indoor module HBS 16 and outdoor module AMS 10-16.
- Integrated clock for scheduling extra hot water and temperature lowering/increasing the flow line temperature.
- Prepared for control of two climate systems.
- Integrated active cooling function.
- Possible to connect external heat sources.

## Principle of operation NIBE SPLIT

### System without hot water, only heating (cooling)




### System heating (cooling) and hot water




### Function

NIBE SPLIT is a system that can produce heating, hot water and cooling.

The principle during heating can be simplified as follows:

1. The refrigerant in AMS 10 retrieves heat from the outdoor air then compresses it, which increases the temperature further.
2. The hot refrigerant (now in gas state) is routed into HBS 16.
3. The refrigerant releases the heat for further distribution in the system.
4. The refrigerant (now in liquid state) is routed back to AMS 10 and the process is repeated.

By reversing the process, thereby allowing the refrigerant in AMS 10 to retrieve the heat from the water and release it into the outdoor air, the heat pump can, if necessary, cool instead.

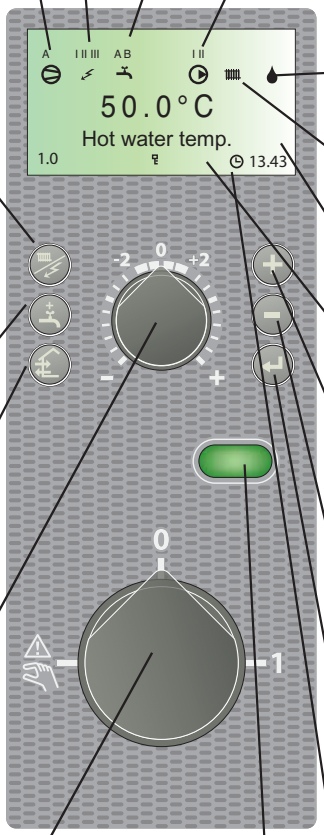
HBS 16 determines when AMS 10 is to work and not to work, using the collated data from the temperature sensor. In the event of extra heat demands, HBS 16 can connect additional heat in the form of the internal immersion heater, or any connected external addition.

## Drain pan heater, control and connection

The drain pan heater is connected to terminal CNF on circuit board PWB1 in the outdoor module. The drain pan heater is supplied with power when one of the following conditions is met:

1. Operating mode "Heating" or "Hot water" is activated.
2. The compressor has been in operation for at least 30 minutes after last start.
3. The ambient temperature is lower than 1 C.

# Front panel, indoor module




**Additional heat symbol**
If the electrical addition is connected
"I" Electrical step 1
"II" Electrical step 2
"II" Electrical step 3
More than one electrical step can be connected at the same time.

**Compressor symbol**
- Heating or cooling demand
"A" Heating mode
"B" Cooling mode

**Operating status**
Pressing the button (the change does not need to be confirmed with the enter button).
-Current operating mode is shown in the display.
-Further button pressing changes operating mode.
Press the enter button to return to the normal display mode.
*For information about the various operating modes, see the different sections regarding comfort settings.*

**Extra hot water (XHW)**
The change does not need to be confirmed with the Enter button.

**Menu 1.0**
Pressing the button takes you directly to menu 1.0.

**Offset heating curve**
- Turning clockwise (+) increases the room temperature (if room sensors are not used).
When the knob is turned menu 2.0 is shown on the display and the value for the current supply temperature changes.

**Switch**
1 Normal mode
All control functions connected.

0 Shutdown

Emergency mode
Only the circulation pump and electrical addition (electrical step 2) are operational.

**Hot water symbol**
The heat pump charges hot water.
"A" Temporary temperature increase in progress.
"B" Time based temperature increase in progress, e.g. periodic.

**Circulation pump symbol**
Circulation pump in operation.
With two circulation pumps (requires accessory ESV), the operating pump is also indicated.

**Defrosting symbol**
Defrosting in progress.

**Climate system symbol**
Heating/cooling in progress.

Description of current display parameter

**Information symbols**
1.0 Menu number
Key lock activated.

**Plus button**
- Scroll forward in the menu system.
- Increase the value of the selected parameter
See the section "Control – General"

**Minus button**
- Scroll back in the menu system.
- Reduce the value of the selected parameter
See the section "Control – General"

**Enter button**
- Select lower menu in the menu system.
- Parameter change activated
- Parameter change confirmed
See the section "Control – General"

**Status lamp**
During normal operation, the status lamp lights green.
In the event of an alarm, it lights red.

**Clock**
Displayed with all activated scheduling.
See the section "Control – Menu 7.0"

## How to use the front panel

All the most common settings are made from the panel as well as control computer instructions such as comfort etc. that you require the heat pump system to fulfil.

In order for the installation to be used optimally, certain basic settings must have been made (see page 9). In addition the installation in general must be carried out according to the instructions and manufacturer's recommendations.

**Menu 1.0 (the temperature in the water heater) is normally shown on the display.**



The plus and minus buttons and the enter button are used to scroll through the menu system as well as to change the set value in some menus.

## Menu types

Control is divided into different menu types depending on how "deep" into the controls you need to go.

- Normal [N]: The settings you as a customer often need.
- Extended [U]: Shows all detailed menus except the service menus.
- Service [S]: Shows all menus.

**Changing of menu type is done from menu 8.1.1**

## Quick movement

To quickly return to the main menu from a sub menu, press one of the following buttons:



## Key lock

A key lock can be activated in the main menus by simultaneously pressing the plus and the minus buttons. The key symbol will then be shown on the display.

The same procedure is used to deactivate the key lock.

# Comfort setting heating

## General

The indoor temperature depends on several factors.

- Sunlight and heat emissions from people and household machines are normally sufficient to keep the house warm during the warmer parts of the year.
- When it gets colder outside, the climate system must be started. The colder it is outside, the warmer radiators and under floor heating systems must be.

### Controlling heat production

Normally, the heat pump heats the water (heating medium) to the temperature required at a certain outdoor temperature. This occurs automatically on the basis of the collected temperature values from the outdoor temperature sensor and sensors on the lines to the climate system (flow line sensors). Extra accessories such as room temperature sensors, can influence the temperature.

However, the correct default settings must be made on the heat pump first, see the section "Default settings".

The temperature information that the outdoor sensor (mounted on an exterior wall of the house) sends to the heat pump's control computer senses variations in the outdoor temperature early on. It does not have to be cold inside the house before the control system is activated, as soon as the average outdoor temperature drops outside, the temperature of the water to the climate system (supply temp.) inside the house is increased automatically.

The heat pumps flow temperature (menu 2.0) will hover around the theoretical required value, which is in brackets on the display.

### Temperature of the climate system

The temperature of the climate system in relation to the outdoor temperature can be modified by using the "Offset heating curve" knob on the heat pump's front panel.

## Operating status



The "Operating mode" button is used to set the required operating mode with regard to permitting/blocking the circulation pump and additional energy.

The change does not need to be confirmed with the enter button.

The current operating mode is shown on the front panel display when the button is pressed and the mode changes when you continue to press the button.

The display returns to the normal display mode once the enter button is pressed.

The addition is only used for anti-freeze mode, if it is deactivated in the menu system. This applies to all operating modes.

The different operating modes are:

1. "Auto"
   - HBS 16 automatically selects the operating mode by taking the outdoor temperature into account. This means that the operating mode switches between "Heating" and "Hot water". Current operating mode is shown within brackets.
   - The circulation pump is permitted to operate when there is a need.
2. "AutoK"*
   - HBS 16 selects operating mode automatic (cooling can also be selected now) with regard to the outdoor temperature. This means that the operating mode switches between "Heating", "Cooling" and "Hot water".
   - The circulation pump is permitted to operate when there is a need.
3. "Heat" / "Heat addition"
   - Only heating and cooling produced.
   - The circulation pump is in operation the entire time.
   - If "Heat addition" is shown the addition is permitted to operate if necessary.
4. "Cooling"* / "Super cooling"
   - If addition is permitted, "Super cooling" is displayed. The compressor then only runs in cooling mode. Otherwise, the mode switches to cooling or producing hot water.
   - The circulation pump is in operation the entire time.
   - Hot water is only produced by the immersion heater.
5. "Hot water"
   - Only hot water is produced.
   - Only the compressor is operational.
6. "Add. heat only"
   - Compressor blocked. The function is activated by pressing in the "operating mode button" for 7 seconds.
7. Deactivate the function by pressing the "Operating mode" button for 7 seconds once again.

* To use the cooling functions, the system must be designed to withstand low temperatures and "Cooling" must be activated in menu 9.3.3.

## Changing the room temperature manually

If you want to temporarily or permanently increase or lower the indoor temperature turn the "Offset heating curve" knob clockwise or anticlockwise. One line approximately represents a 1 degree change in room temperature.

**NOTE**

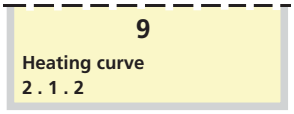
*An increase in the room temperature may be inhibited by the radiator or underfloor heating thermostats, if so these must be turned up.*

## Default setting

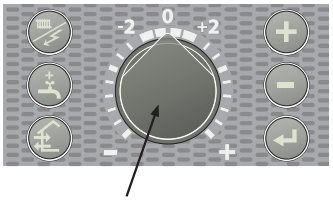
The basic heating is set using menu 2.1.2 and with the "Heating curve offset" knob.

If the required room temperature is not obtained, readjustment may be necessary.

If you do not know the correct settings use the basic data from the automatic heating control system diagram opposite.




Menu 2.1.2 Heating curve



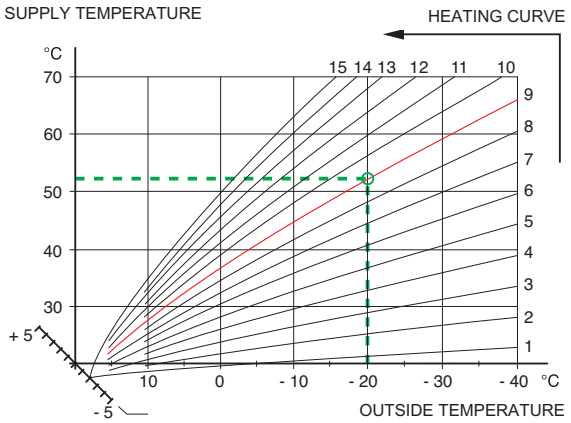

Offset heating curve

**NOTE**

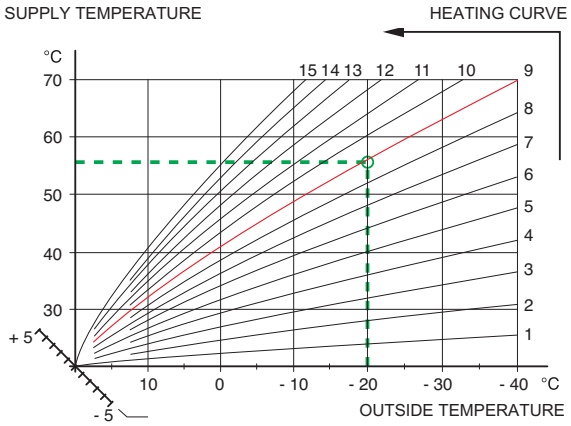
*Wait one day between settings so that the temperatures have time to stabilise.*

### Setting with diagrams

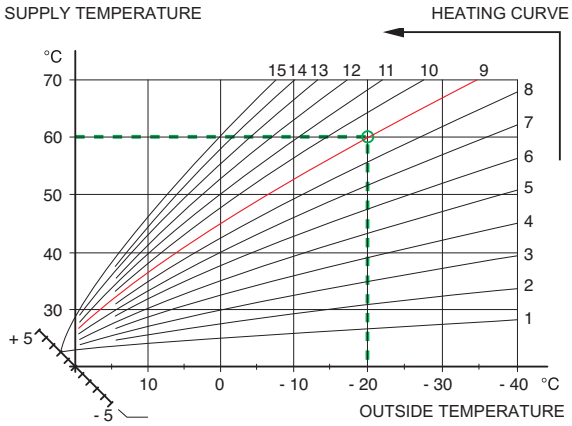
The diagram is based on the dimensioned outdoor temperature in the area and the dimensioned flow temperature of the climate system. When these two values "meet", the heating control's curve coefficient can be read. This is set under menu 2.1.2, "Heating curve". Limitations, which are not in the diagrams, are included in the control system's permitted min and max temperatures.




OFFSET HEAT CURVE -2




OFFSET HEAT CURVE 0




OFFSET HEAT CURVE +2

## Readjusting the default settings

If the required room temperature is not obtained, readjustment may be necessary.

Cold weather conditions

- When the room temperature is too low, the "Heating curve" value is increased in menu 2.1.2 by one increment.
- When the room temperature is too high, the "Heating curve" value is decreased in menu 2.1.2 by one increment.

Warm weather conditions

- If the room temperature is low, increase the "Heating curve offset" setting by one step clockwise.
- If the room temperature is high, reduce the "Heating curve offset" setting by one step anti-clockwise.

# Comfort setting cooling

## General

The condition in order for cooling to be activated is that "On" is selected in menu 9.3.3 Cooling system.

**NOTE**

*The climate system must manage cooling operation. Settings must be made by the installer when commissioning the system.*

If a room sensor is connected, it starts and stops cooling together with the outdoor temperature. The lowest calculated supply temperature is set in menu 2.2.4.

## Cooling operated from the outdoor sensor in operating mode AutoK

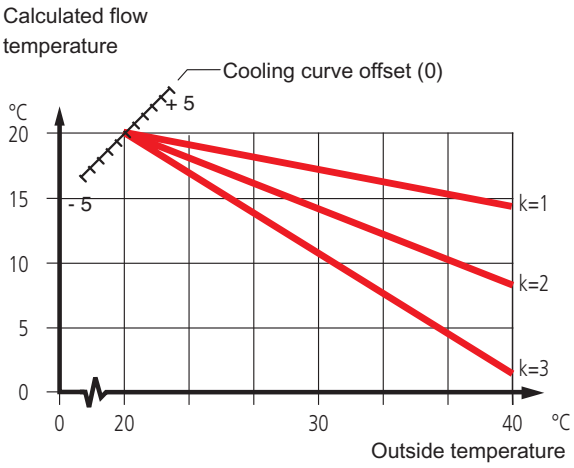
If the cooling system is set to "On" in menu 9.3.3 and the outdoor temperature is greater or equivalent to the set start temperature for cooling in menu 8.2.4, cooling starts.

Cooling stops when the outdoor temperature drops below the set value minus the set value in menu 8.2.5.

The calculated flow line temperature is determined from the selected cooling curve in menu 2.2.2 and the offset for cooling curve, menu 2.2.1. Limitations, which are not in the diagram, are included in the control system's permitted min temperature.

**NOTE**

*HBS 16 has limited cooling operation down to 18 °C flow line.*




## Controlling cooling mode using the room sensor

If RG 10 is present, the condition for cooling is that the room temperature has exceeded the set room temperature (menu 6.3) by the set value in menu 8.2.5 and that the outdoor temperature is equivalent to or exceeds the set outdoor temperature value (menu 8.2.4).

When the room temperature has dropped below the set room temperature in menu 6.3 by the set value in menu 8.2.5 or the outdoor temperature falls below the set value in menu 8.2.4 by the set value in menu 8.2.5, cooling switches off.

# Comfort setting hot water

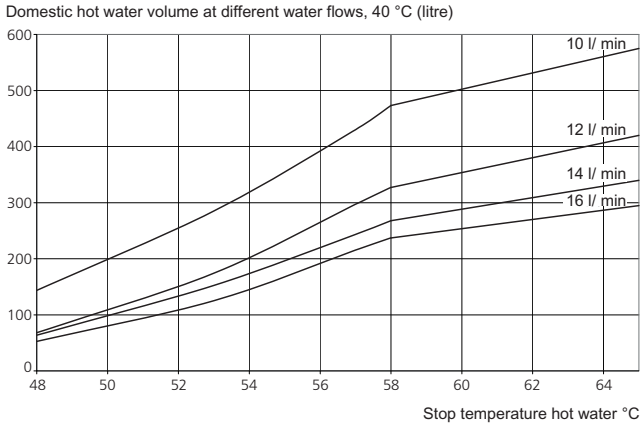
The water heaters are coil models and are heated by circulating water, which is heated by the heat pump.

During "normal" consumption it is enough to run the heat pump's compressor to supply the different tapping points of the house with hot water. The temperature of the hot water in the water heater then varies between the set values.

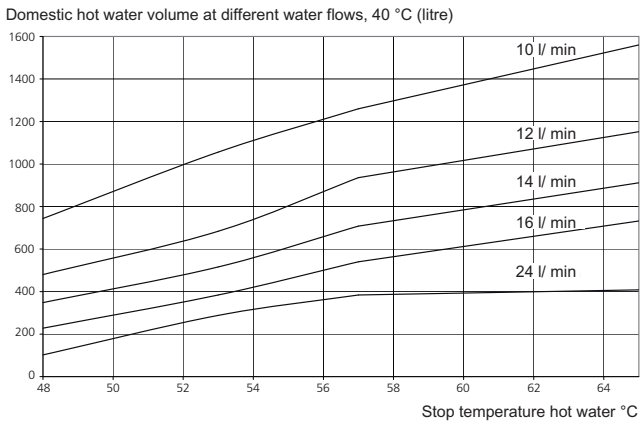
Under section 1.0 [N] Hot water temp. on page 54 there is a complete description of menu settings for hot water temperatures.

## Available volume

HEV 300




HEV 500




## Prioritizing

If the water within the water heater requires heating, the heat pump prioritises this and shifts to hot water mode with the entire heat pump output.

In this mode, there is no heating or cooling.

Prioritizing can be affected via settings in the front panel.

See "1.0 [N] Hot water temp." on page 54.

## Extra Hot Water

In all "Extra hot water" functions, the temperature of the hot water increases temporarily. The temperature is first increased to an adjustable level by the compressor (menu 1.5) and then the electrical addition increases until the stop temperature is reached (menu 1.4).

Temporary "Extra hot water" is activated manually, whilst time based extra hot water is activated using the settings made in the control computer.

When:

- "A" appears above the icon, temporary extra hot water is active.
- "B" appears above the icon, time based extra hot water is active.

**NOTE**

*"Extra hot water" usually means that the electrical addition has been activated and therefore increases the electrical consumption.*

**"Extra hot water" can be activated in three different ways:**

1. **Periodic time based extra hot water**
   - Interval between increases selected in menu 1.7. Menu 1.8 shows when the next increase is due.
   - The increased temperature is maintained by the electrical addition for one hour.
2. **Schedule time based extra hot water**
   - The start and stop times for the day of the week that the increase is required are set in the sub menus to menu 7.4.0.
   - The increased temperature is maintained by the electrical addition for the selected period.
3. **Temporary extra hot water**
   - The current "extra hot water" mode is shown on the display (A) when the button is pressed and when you continue to press the button the mode changes between 3 hours and standby mode.
   - The increased temperature is maintained by the electrical addition until the period of time has expired.

# Maintenance

HBS 16 and AMS 10 require minimal maintenance after commissioning.

NIBE SPLIT contains many components and is why monitoring functions are integrated to help you.

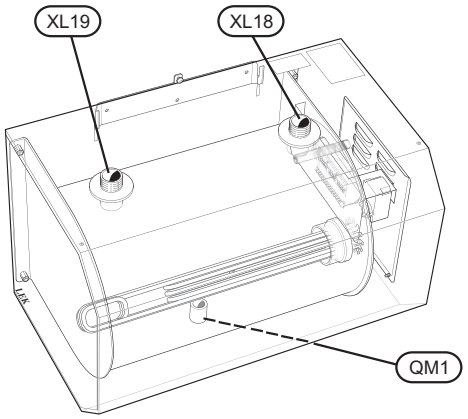
If something abnormal occurs, a message appears about malfunctions in the form of different "alarm" texts in display.

## Checking the safety valves

The installation has been equipped with a safety valve for the water heater as well as a safety valve for the climate system by the installer.

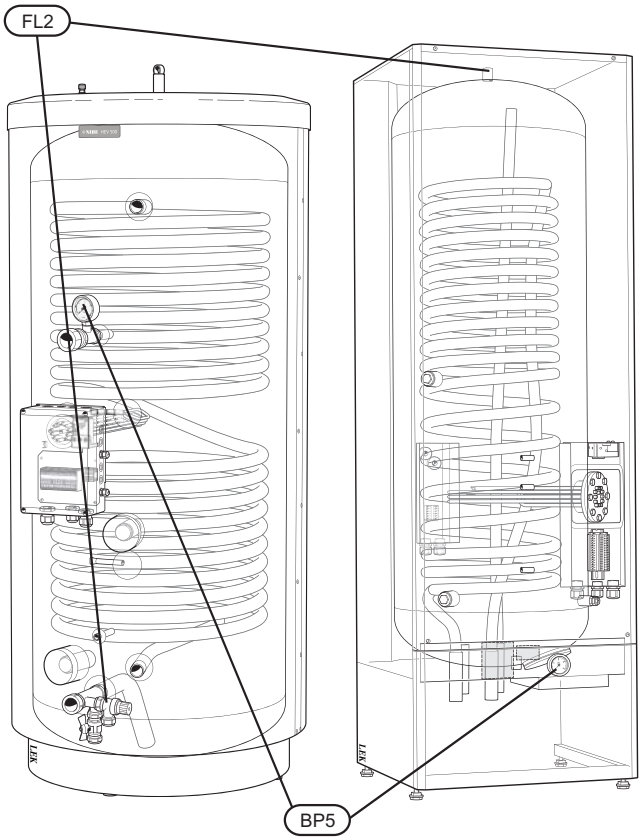
**The climate system's safety valve**

**HE 30**




The climate system's safety valve (FL2) is near to HE 30 or by the hot water tank. See illustration.

**HEV 300/HEV 500**




The climate system's safety valve (FL2) must be completely sealed. Checks must be carried out regularly as follows:

- Open the valve.
- Check that water flows through the valve. If this does not happen, replace the safety valve.
- Close the valve again.
- The climate system may need to be refilled after checking the safety valve, see the section "Filling the climate system". Contact your installer for refilling the climate system.

**Safety valve domestic water**

The safety valve for domestic water sometimes releases a little water after hot water has been tapped. This is because the cold water, which enters the heater to replace the hot water, expands when heated causing the pressure to rise and the safety valve to open.

Also check the safety valve for domestic water regularly. The appearance and location of the safety valve differs between different installations. Follow the cold water pipe to locate the safety valve. Contact your installer for information.

## Pressure gauge in HE 30, HEV 300, HEV 500

The working range of the climate system is normally 0.5 – 1.5 bar when the system is closed, depending on the height of the system. Check this on the pressure gauge (BP5).

## Emptying the coil in the water heater

The water heater is of the coil type and the pressure in the domestic coil can be released by closing the incoming water and opening the hot water tap. However, some water may remain in the domestic coil. Drain by removing the XL3 cold water connection on the heater.

## Emptying the vessel

Contact your installer if the vessel in HE 30, HEV 300, HEV 500 needs emptying.

## Maintenance of AMS 10

AMS 10 is equipped with control and monitoring equipment, however some exterior maintenance is still necessary.

Make regular checks throughout the year that the inlet grille is not clogged by leaves, snow or anything else. During the cold months of the year, check to make sure that there isn't a build up of ice or frost under AMS 10. Strong wind combined with heavy snowfall can block the intake and exhaust air grilles. Make sure that there is no snow on the grilles.

Also check that the condensation water drain under AMS 10 is not blocked.

If necessary the outer casing can be cleaned using a damp cloth. Care must be exercised so that the heat pump is not scratched when cleaning. Avoid spraying water into the grilles or the sides so that water penetrates into AMS 10. Prevent AMS 10 coming into contact with alkaline cleaning agents.

**⚠ WARNING!**

*Rotating fan in AMS 10.*

## Saving tips

Your NIBE SPLIT installation produces heat and hot water according to your needs. It also attempts to carry out all requirements with all available "aids" from the control settings made.

The indoor temperature is naturally affected by the energy consumption. Therefore, take care not to set a temperature higher than necessary.

Other known factors that affect the energy consumption are, for example, hot water consumption and the insulation level of the house, as well as the level of comfort you require.

**Also remember:**

- Open the thermostat valves completely (except in the rooms that are to be kept cooler for various reasons, e.g. bedrooms).

Thermostat valves in the radiators and floor loops can negatively affect the energy consumption. They slow the flow in the climate system, which the heat pump wants to compensate with increased temperatures. It then works harder and consumes more electrical energy.

# Dealing with comfort disruption

Use the following list to find and remedy any heating or hot water problems.

| Symptom | Cause | Action |
|---|---|---|
| Low hot water temperature or a lack of hot water. | Circuit or main miniature circuit breaker (MCB) tripped. | Check and replace blown fuses. |
| | Heat pump and immersion heater do not heat. | Check and replace any blown circuit and main fuses. |
| | Possible earth circuit-breaker tripped. | Reset the earth circuit-breaker, if the earth circuit-breaker trips repeatedly, call an electrician. |
| | Switch (SF1) set to mode 0. | Set the switch to 1. |
| | Large hot water demand. | Wait a few hours and check if the hot water temperature rises. |
| | Too low start temperature setting on the control system. | Adjust the start temperature setting in menu 1.2. |
| Low room temperature. | Possible earth circuit-breaker tripped. | Reset the earth circuit-breaker, if the earth circuit-breaker trips repeatedly, call an electrician. |
| | Heat pump and immersion heater do not heat. | Check and replace any blown circuit and main fuses. |
| | Incorrect setting of "Curve slope", "Heating curve, offset" and/or "Cooling curve, offset". | Adjust the setting. |
| | Circuit or main miniature circuit breaker (MCB) tripped. | Check and replace blown fuses. |
| | Heat pump in incorrect operating mode "Hot water" or "Cooling". | Change operating mode to "Auto" or "AutoK". |
| | The current limiter has restricted the current because many power consumers are being used in the property. | Switch off one/several of the power consumers. |
| High room temperature. | Incorrect setting of "Curve slope", "Heating curve, offset" and/or "Cooling curve, offset". | Adjust the setting. |
| | Heat pump in incorrect operating mode. | Change operating mode to "AutoK". |
| | Incorrect settings for cooling. | Adjust the settings. Check menu 2.2.1, 2.2.2 and 8.2.4. |
| The compressor does not start. | Minimum time between compressor starts, alternatively time after power switch on not achieved. | Wait 30 minutes and check if the compressor starts. |
| | Alarm tripped. | See section "Alarms". |
| | Alarm cannot be reset. | Activate operating mode "Only additional heat". |
| Display not lit. | | Check and replace any blown circuit and main fuses. |
| | | Check that the circuit breaker to the indoor unit is not off. |
| | | Check that the switch (SF1) is in normal position (1). |

## Operating mode "Add. heat only"

In the event of malfunctions that cause a low indoor temperature, you can normally activate "Add. heat only" in HBS 16, which means that heating only occurs with the immersion heater.

Activate the mode by holding in the operating mode button  for 7 seconds.

Note that this is only a temporary solution, as heating with the immersion heater does not make any savings.

Deactivate the function by pressing the "Operating mode" button for 7 seconds once again.

## Emergency mode

Emergency mode is activated by setting the switch to "⚠". It is used when the control system and thereby operating mode "Add. heat only" do not function as they should. Emergency mode is activated by setting switch (SF1) to "⚠".

The following applies in emergency mode:

- The front panel is not lit and the control computer in HBS 16 is not connected.
- AMS 10-16 is off and only the circulation pump HBS 16 and the immersion heater in HE 30, HEV 300, HEV 500 are active.
- An electrical step of 4 kW is connected. The immersion heater is controlled by a separate thermostat (BT30).
- The automatic heating control system is not operational, so manual shunt operation is required. Call installer.

# Alarm indications

There are many monitoring functions integrated in NIBE SPLIT to alert you to any malfunctions, the control computer transmits alarm signals that can be read from the front panel display.

## What happens in the event of an alarm?

- The background lighting in the display starts flashing and the status lamp lights red.
- Compressor alarms and outdoor sensor errors change the operating mode to "Anti freeze" and reduce the supply temperature to the minimum permitted temperature to notify you that something is wrong.

**Different types of alarms**

- Alarms with automatic reset (do not need to be acknowledged when the cause has disappeared).
- Existing alarms that require corrective action by you or the installer.
- A complete list of alarms is on page 67.

## Recommended actions

1. Read off which alarm has occurred from the heat pump's display.
2. As a customer you can rectify certain alarms. See the table below for relevant actions. If the alarm is not rectified, or is not included in the table, contact your installer.

| Alarm text on the display | Alarm description | Check/remedy before installers/service technicians are called |
|---|---|---|
| LP-LARM | Tripped low pressure pressostat. | Check that the thermostats for the radiators/under-floor heating systems are not closed (only during cooling operation). |
| HP-LARM | Tripped high pressure pressostat. | Check that the thermostats for the radiators/under-floor systems are not closed.<br>If cooling is in progress: Check that the air flow to AMS 10 is not obstructed. |
| OU power failure / OU Com. error | Outdoor unit not powered / Communication cut | Check that any circuit breakers to the outdoor unit are not off. |
| Display not lit. | | Check and replace any blown circuit and main fuses. |
| | | Check that the circuit breaker to the indoor unit is not off. |
| | | Check that the switch (SF1) is in normal position (1). |

## Acknowledging alarms

No harm in acknowledging an alarm. If the cause of the alarm remains, the alarm recurs.

- When an alarm has been triggered, it can be acknowledged by switching HBS 16 off and on using the switch (SF1). Note that when the power is switched on there is a 30 minute delay before the heat pump restarts. Alternatively, the alarm can be acknowledged in menu 9.7 (service menu).
- When the alarm cannot be reset using the switch (SF1), the operating mode, "Add. heat only", can be activated to resume a normal temperature level in the house. This is most easily carried out by holding the "Operating mode" button in for 7 seconds.
- Deactivate the function by pressing the "Operating mode" button for 7 seconds once again.

**NOTE**

*Recurring alarms mean that there is a fault in the installation.*

*Contact your installer!*

# General information for the installer

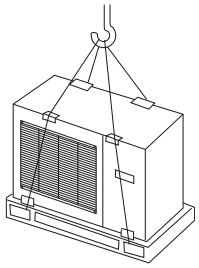
## Transport and storage

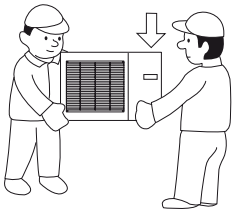
### Outdoor module AMS 10

AMS 10-16 should be transported and stored vertically.

If the heat pump is to be lifted using lifting straps without packaging, protect as illustrated.

The right-hand side of the heat pump (seen from the front) is heavier.





### The HBS 16 hydrobox

HBS 16 can be transported horizontally on its back and must be stored horizontally and in dry conditions.

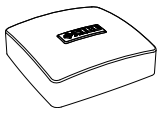
### HE 30, HEV 300, HEV 500 tanks

HEV 300 and HEV 500 must be transported and stored vertically in a dry place.

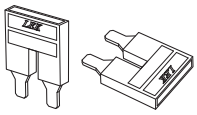
HE 30 must be transported and stored horizontally on its back in a dry place.

## Supplied components

HBS 16



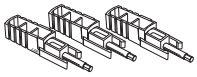
Outside sensor



Straps for 1 phase connection

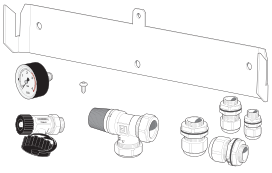


Current sensor, 3 phase

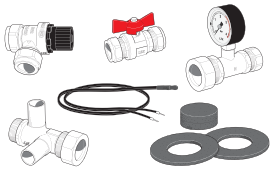


Keys for the actuator motors

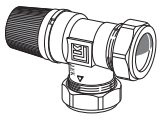
HE 30, HEV 300, HEV 500



Enclosed kit HE 30



Enclosed kit HEV 500



Safety valve HEV 300

The enclosed kits are located behind the front service cover in HBS 16, in the cardboard box on HE 30 and taped under the tank on HEV 300 and on the pallet by HEV 500.

## Assembly

### AMS 10-16

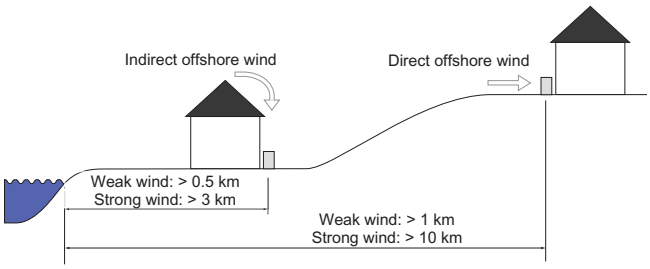
Position AMS 10-16 outdoors secured to a firm surface, preferably concrete foundation with ground stand near walls or wall mounting.

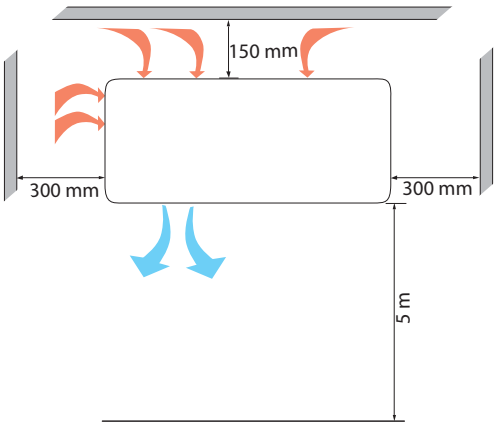
It must be positioned so that the lower edge of the evaporator is at the level of the average local snow depth, although a minimum of 200 mm. AMS 10-16 should not be positioned next to noise sensitive walls, for example, next to a bedroom. Also ensure that the placement does not inconvenience the neighbours. Care must be exercised so that the heat pump is not scratched during installation.

Large amounts of condensation water as well as melt water from defrosting can be produced. Provide good drainage at the installation area and make sure water cannot run out onto paths or the like during periods that ice can form.

The distance between AMS 10-16 and the house wall must be at least 150 mm. Ensure that there is at least one metre free space above AMS 10-16. **AMS 10-16 must not be placed so that recirculation of outdoor air can occur. AMS 10-16 must not be placed in a windy location where it is exposed to direct strong winds. This causes lower output and impaired efficiency and it also negatively affects the defrosting function.**

For wall installation, ensure that vibrations do not affect the inside of the house. Also ensure that the wall and mounting can take the weight of the heat pump.




### HBS 16

- It is recommended that HBS 16 is installed in a room with existing floor drainage, most suitably in a utility room or boiler room.
- Hang HBS 16 with its back to an outside wall, ideally in a room where noise does not matter. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem.
- Wall bracket (2-piece) for hanging is mounted on the rear of the HBS 16. Secure the one piece of the wall bracket in the wall of a suitable material. Then mount HBS 16 on the wall. Lock HBS16 to the wall bracket using the two original screws.
- Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.
- Ensure that there is approx. 500 mm free space in front of and 220 mm above the product for any future service. Ensure that there is sufficient space under the machine for pipework and valves. Hang the machine at a height where the display can be read.

### HE 30

- It is recommended that the HE 30 tank is installed in a room with existing floor drainage, most suitably in a utility room or boiler room.
- Hang the tank with its back to an outside wall, ideally in a room where noise does not matter. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem.
- Secure the wall bracket (enclosed) to a wall of a suitable material. Hook the tank onto the wall bracket. Install the enclosed screw in the upper hole on the wall bracket to hold the tank in place.
- Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.
- Ensure that there is approx. 500 mm free space in front of, 600 mm to the right and 220 mm above the product for pipework and any future service. Ensure that there is sufficient space for the drain valve under the tank.
- HE 30 is supplied with a manometer, a drainage valve and a safety valve. The safety valve (FL2) should be installed as close to the tank as possible. The drainage valve should be positioned at the lowest point. The location of the manometer (BP5) is less sensitive.

### HEV 300, HEV 500

- It is recommended that the water heater is installed in a room with existing floor drainage, most suitably in a utility room or boiler room.
- The surface must be firm, preferably a concrete floor or foundation.
- The unit can be aligned using the adjustable feet.
- Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.

- Ensure that there is approx. 500 mm free space in front of and 220 mm above the water heater for any future service.

## Dimensioning expansion vessel

HBS 16 is equipped with a membrane expansion vessel on 18 l. A larger expansion vessel may be required depending on installation. The expansion vessel must be dimensioned for every installation. If a larger expansion vessel is required, the existing expansion vessel can be shut off.

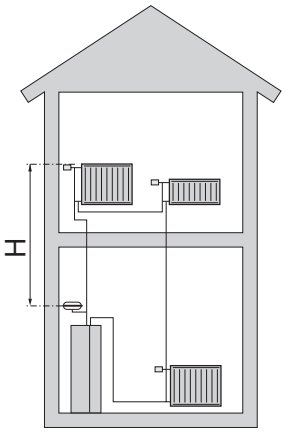
| Volume per component | |
|---|---|
| HBS 16 | 4 l |
| HE 30 | 30 l |
| HEV 300 | 300 l |
| HEV 500 | 500 l |

### Initial pressure and max height difference

The initial pressure of the pressure expansion vessel must be dimensioned according to the maximum height (H) between the vessel and the highest positioned radiator, see figure. An initial pressure of 0.5 bar (5 mvp) means a maximum permitted height difference of 5 m.

If the standard initial pressure in the pressure vessel is not high enough it can be increased by filling via the valve in the expansion vessel. The expansion vessel's standard initial pressure must be entered in the check list on page 43.

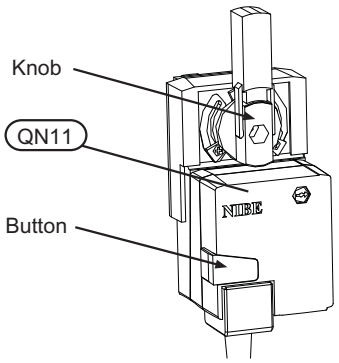
Any change in the initial pressure affects the ability of the expansion vessel to handle the expansion of the water.




## Manual shunting

When HBS 16 is set to emergency mode, the heating control system is not in operation, and manual shunt operation is required.

1. Depress and lock the button on (QN11).
2. Turn the mixing valve to the desired position by hand.




## Emptying the vessel

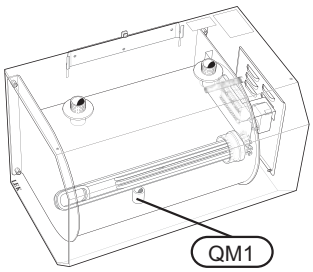
The vessel in HE 30, HEV 300, HEV 500 is emptied by opening the valve (QM1) and safety valve (FL2).

**NOTE**

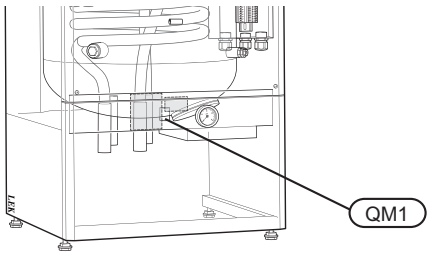
*When HEV 300/HEV 500 is emptied via the valve (QM1), some water will remain in the coil and in HBS 16.*

*This means that there is a risk of the heat exchanger, pipes and valves freezing at low temperatures as well as a hygienic risk for the coil in the hot water section.*

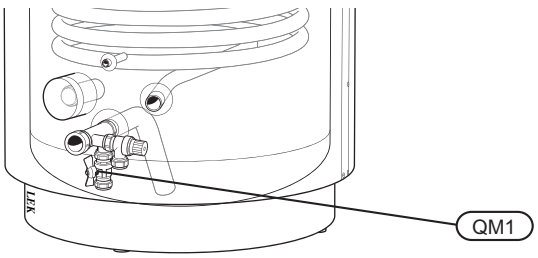
**HE 30**




**HEV 300**




**HEV 500**



## Recommended installation order

1. Connect HBS 16 to the climate system and to the tank. Connect cold and hot water lines as well as any external heat sources to the tank. See page 24. Also see docking descriptions on page 29 and further on.
2. Install the refrigerant pipes according to the description on page 26.
3. Connect the load monitor, outdoor temperature sensor, any centralised load control and external contacts as well as the cable between HBS 16, the tank and AMS 10-16. See page 35.
4. Connect supply to HBS 16. See page 33.
5. Follow the commissioning instructions on page 40.

# Pipe installation

## General

Pipe installation must be carried out in accordance with current norms and directives. HBS 16 can work at a temperature up to 65 °C. For good savings we recommend that the climate system is dimensioned for max 55 캚.

HBS 16 is not equipped with shut-off valves. These must be installed outside the indoor module to facilitate any future servicing.

HBS 16 can be connected to the radiator system, floor heating system and/or fan convectors.

**Overflow valve**

**NOTE**

*A free flow is required for all docking options, which means that an overflow valve must be installed.*

## System requirements

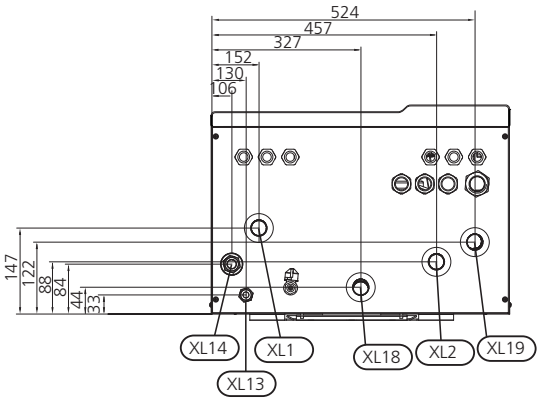
This is required for minimum configuration:

For correct function the volume of the climate system must meet the installation requirements, see page 29. If this is not fulfilled, volume vessel (NIBE UKV) must be installed.

For more options, see the docking description on page 29.

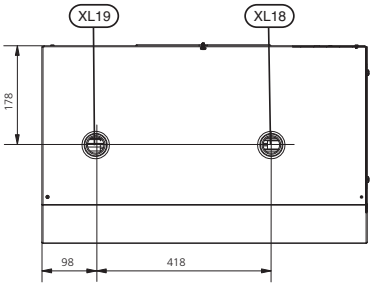
## Dimensions and pipe connections

**HBS16**



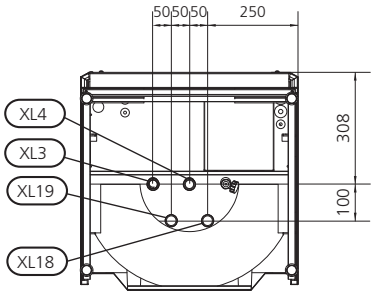

XL1 Climate system, flow Ø 28 mm
XL2 Climate system, return Ø 28 mm
XL13 Liquid line refrigerant, flare 3/8''
XL14 Gas line refrigerant, flare 5/8"
XL18 Connection, Circulation
XL19 Connection, Circulation

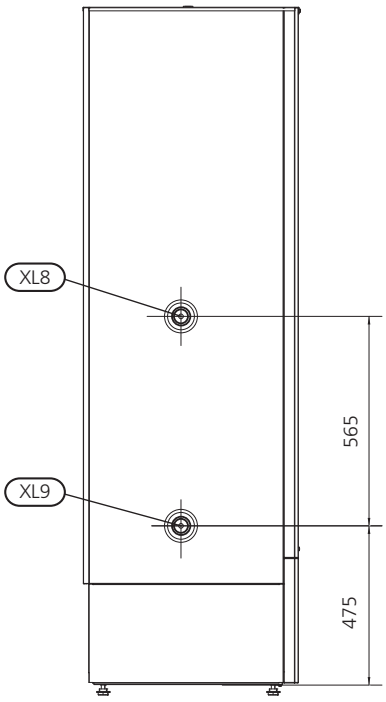
**HE 30**




XL18 Connection, Circulation
XL19 Connection, Circulation

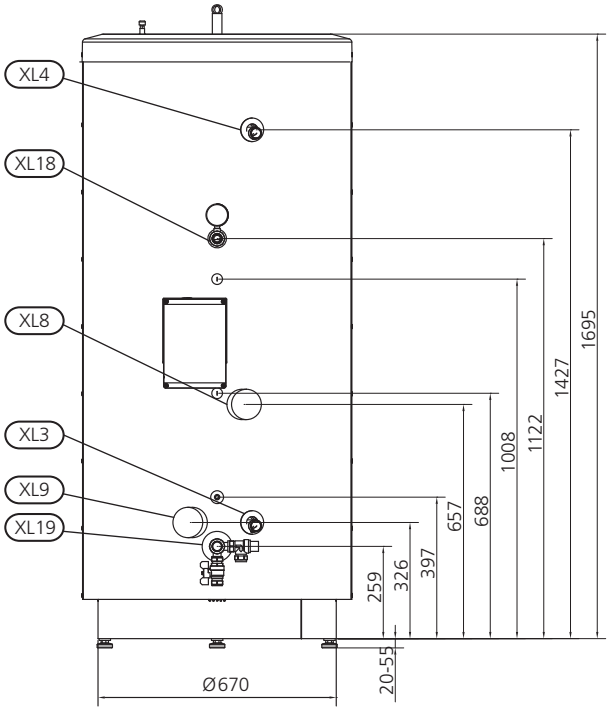
**HEV 300**



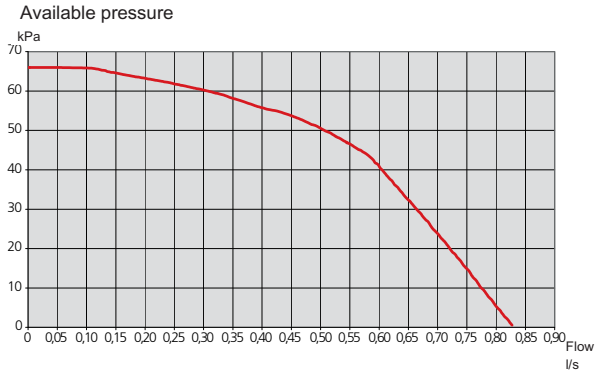

XL3 Connection, Cold water
XL4 Connection, Hot water
XL8 Connection, Docking, in heating medium
XL9 Connection, Docking, out heating medium
XL18 Connection, Circulation
XL19 Connection, Circulation

### HEV 500




XL3 Connection, Cold water
XL4 Connection, Hot water
XL8 Connection, Docking, in heating medium
XL9 Connection, Docking, out heating medium
XL18 Connection, Circulation
XL19 Connection, Circulation

## Pump capacity diagram




The diagram shows max. performance. This can be restricted in menu 2.0.

### Connection of extra circulation pump

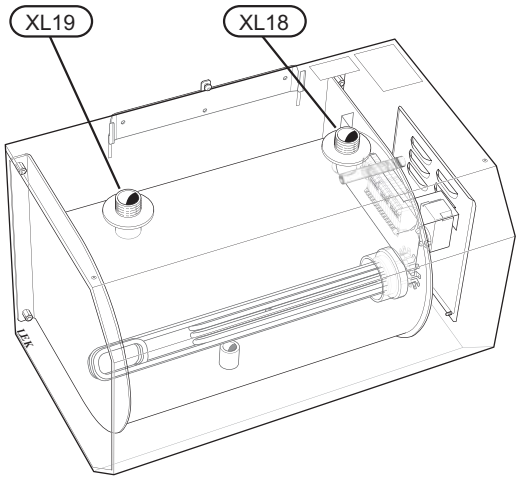
When connecting additional circulation pump GP10, to achieve a higher flow capacity, see alternative "Underfloor heating systems" on page 32. Respective maximum flows must not be exceeded.

## Connecting HBS 16 to tank

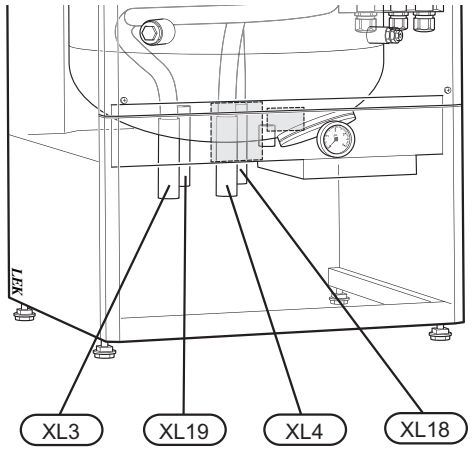
It is necessary to connect a water heater or a tank to HBS 16. Pipe connections for the climate system are made at the bottom of HBS 16.

- The tank HE 30, HEV 300, HEV 500 and pipework forHBS 16 must be installed indoors where the temperature does not fall below 15 °C.
- Maximum pipe length between HBS 16 and HE 30, HEV 300, HEV 500 is 10 m.
- Connection (XL 18) on HBS 16 connected to the tank's terminal connection (XL 18).
- Connection (XL 19) on HBS 16 connected to the tank's terminal connection (XL 19).
- Hang HE 30 on the wall. HEV 300/HEV 500 should be positioned on a firm surface, preferably a concrete foundation.
- HEV 300/HEV 500 level can be adjusted with the help of the adjustable feet.
- Ensure that there is approx. 500 mm free space in front of and 220 mm above HE 30, HEV 300, HEV 500 for any future service.

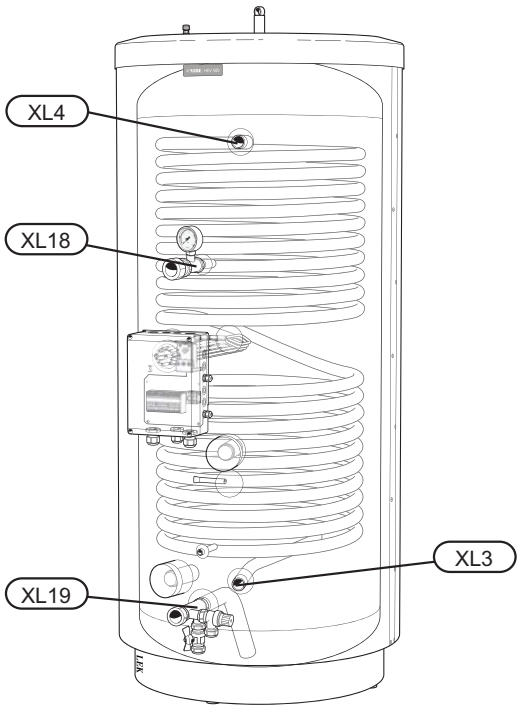
### HE 30




### HEV 300



**HEV 500**




## Connecting the climate system

- Connect HBS 16 pipe connections (XL1) and (XL2) to the climate system.

**NOTE**

*The term "Climate system" which is used in these installation and maintenance instructions regards heating or cooling systems from HBS 16 for heating or cooling.*

## Connecting the hot water heater

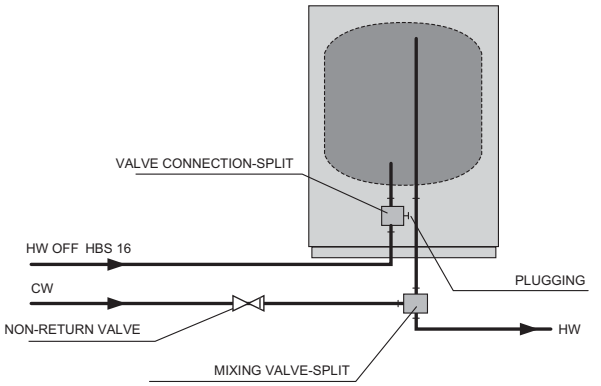
The water heater (HEV 300/HEV 500) must be supplied with necessary set of valves.

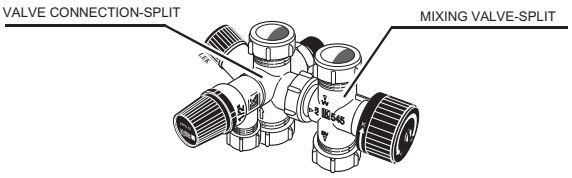
- There must be a mixing valve if the temperature exceeds 60 °C.
- The safety valve must have a maximum 10.0 bar opening pressure and be installed on the incoming domestic water line according to outline diagram. The entire length of the overflow water pipe from the safety valves must be inclined to prevent water pockets and must also be frost proof.
- See section Dockings on page 29 for outline diagram.

### Extra electric hot water heater

If further hot water capacity is required, the heat pump can be supplemented with an electric water heater.

The valve part is integrated but must be separated (as illustrated) if the water heater is used as an additional water heater.



## Connection of external heat source

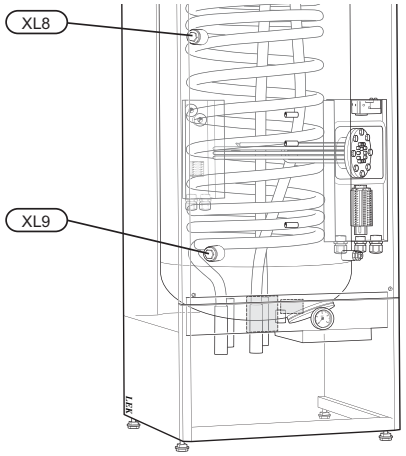
Connect an external heat source such as gas or oil boiler to (XL8) (in) and (XL9) (out) on HEV 300/HEV500 (dimension G1 internal). Remove any insulation from over the connections to release them.

Also see Installation requirements on page 29.

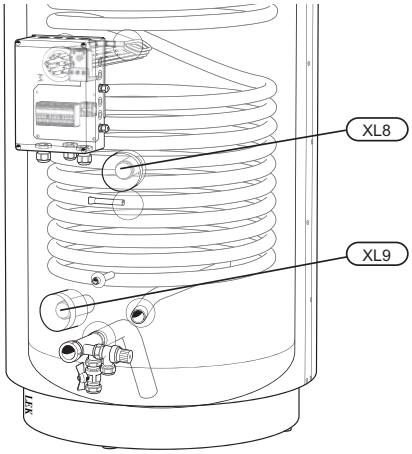
**NOTE**

*Make connections at a 45° angle.*

**HEV 300**

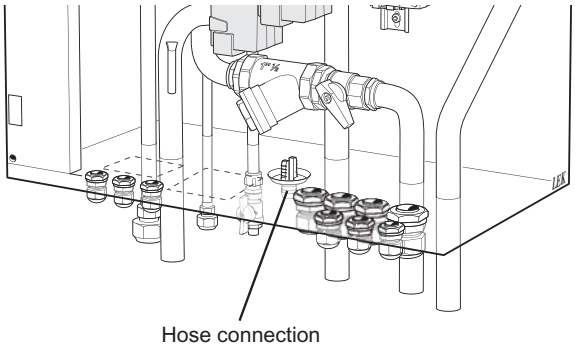



**HEV 500**




## Waste exchanger part

HBS 16 is equipped with a hose connection at the bottom. A hose can be connected if required.



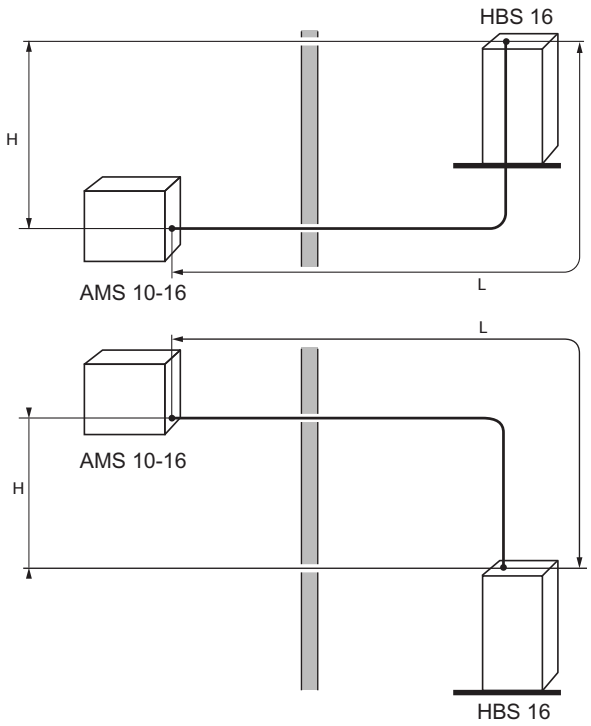
## Connecting refrigerant pipes (not supplied)

Install the refrigerant pipes between the outdoor module AMS 10 and HBS 16.

Installation must be carried out in accordance with current norms and directives.

### AMS 10-16 limitations

- Maximum pipe length, AMS 10-16 (L): 15 m.
- Maximum height difference (H): ±7 m.




### Pipe dimensions and materials

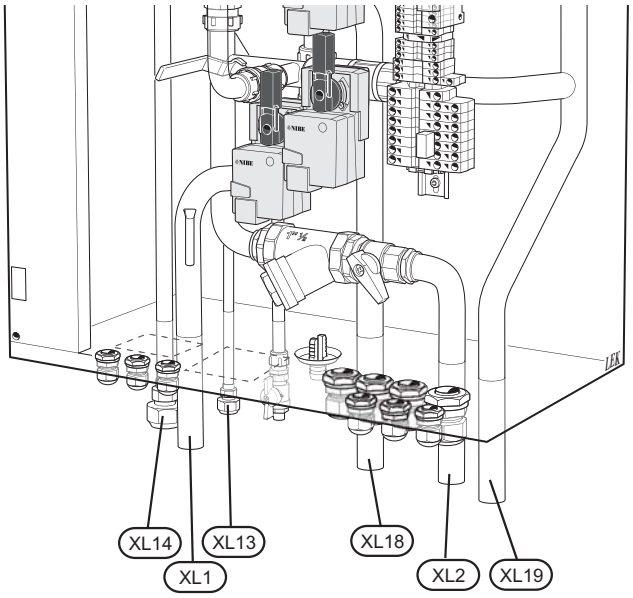
| | Gas pipe | Liquid pipe |
|---|---|---|
| Pipe dimension | Ø15.88 mm (5/8") | Ø9.52 mm (3/8") |
| Connection | Flare - (5/8") | Flare - (3/8") |
| Material | Copper quality SS-EN 12735-1 or C1220T, JIS H3300 | |
| Minimum material thickness | 1.0 mm | 0.8 mm |

### Pipe connection

- Perform pipe installation with the service valves (QM35, QM36) closed.

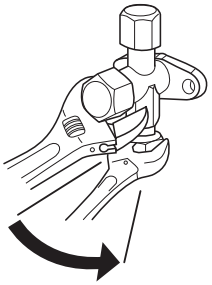
- **HBS 16**

  The image below, shows possible pipe outlets.




- Ensure that water or dirt does not enter the pipes.
- Bend the pipes with as large a radius as possible (at least R100~R150). Do not bend a pipe repeatedly. Use a bending tool.
- Connect the flare connector and tighten to the following torque. Use the "Tightening angle" if a torque wrench is not available.

| Outer diameter, copper pipe (mm) | Tightening torque (Nm) | Tightening angle (°) | Recommended tool length (mm) |
|---|---|---|---|
| Ø9.52 | 34~42 | 30~45 | 200 |
| Ø15.88 | 68~82 | 15~20 | 300 |

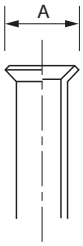


**NOTE**

*Gas shielding must be used when soldering.*

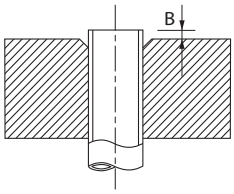
### Flare connections

Expansion:




| Outer diameter, copper pipe (mm) | A (mm) |
|---|---|
| Ø9.52 | 13.2 |
| Ø15.88 | 19.7 |

Ejection:




| Outer diameter, copper pipe (mm) | B, with an R410A tool (mm) | B, with a conventional tool (mm) |
|---|---|---|
| Ø9.52 | 0~0.5 | 0.7~1.3 |
| Ø15.88 | | |

### Pressure test and leak test

Both HBS 16 and AMS 10 are pressure tested and leak tested at the factory, but the pipe connections between the products must be checked after installation.

**NOTE**

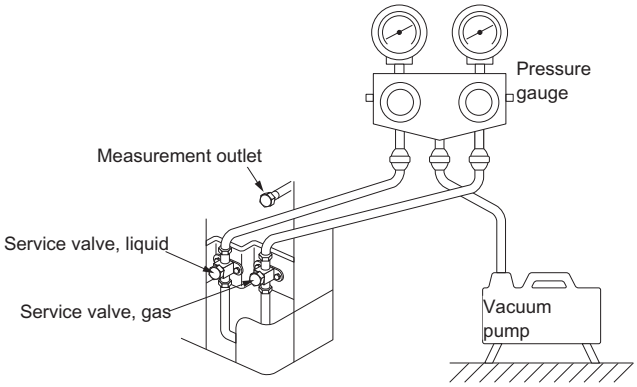
*The pipe connection between the products must be pressure tested and leak tested according to the applicable regulations after installation.*

*Under no circumstances must a type of medium other than nitrogen be used when pressurising or flushing the system.*

### Vacuum pump

Use a vacuum pump to evacuate all air. Vacuum for at least one hour and end pressure after evacuation must be 1 mbar (100 Pa, 0.75 dry or 750 micron) absolute pressure.

If the system has remaining moisture or a leak, the vacuum pressure will rise after completed evacuation.




**TIP**

*For a better end result and to quicken the evacuation, the following points must be followed.*

- *The connection lines must be as large and short as possible.*
- *Evacuate the system down to 4 mbar and fill the system with dry nitrogen to atmospheric pressure to the finish the evacuation.*

### Filling refrigerant

AMS 10-16 is delivered complete with the refrigerant required for the installation of refrigerant pipes up to 15 m in length.

**NOTE**

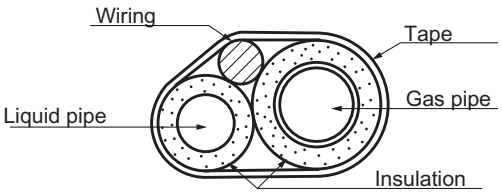
*For installations with refrigerant pipes up to 15 m in length no extra refrigerant in addition to the supplied amount needs to be topped up.*

When carrying out pipe connections, pressure tests, leak tests and vacuuming, the service valves (QM35, QM36) can be opened, to fill the pipes and HBS 16 with refrigerant.

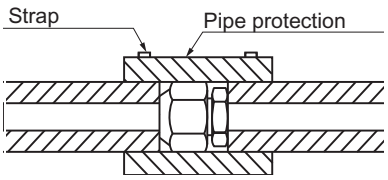
### Insulating refrigerant pipes

- Insulate refrigerant pipes (both gas and liquid pipes) for heat insulation and to prevent condensation.
- Use insulation that can withstand at least 120 °C. Poorly insulated pipes can cause insulation related problems and unnecessary cable wear.

Principle:




Connections:



## Dockings

### General

NIBE SPLIT can be connected in several different ways , some of which are shown on the following pages. For more detailed docking descriptions, see www.nibe.eu.

### Installation requirements

| | AMS 10-16 |
|---|---|
| Max pressure, climate system | 0.25 MPa (2.5 Bar) |
| Max temperature, climate system | +65 °C |
| Max temperature in HBS 16 | +65 °C |
| Max temperature from external heat source | +65 °C |
| Max flow line temperature with compressor | +58 °C |
| Min supply temperature cooling | +18 °C |
| Max supply temp. cooling | +25 °C |
| Min volume, climate system during heating, cooling* | 150 l |
| Min volume, climate system during under floor cooling* | 150 l |
| Max flow, climate system | 0.79 l/s |
| Min flow, climate system, at 100% circulation pump speed (defrost flow) | 0.39 l/s |
| Min flow, heating system | 0.24 l/s |
| Min flow, cooling system | 0.32 l/s |

| Docking external addition | HEV 300 | HEV 500 |
|---|---|---|
| Output external addition | 9–27 kW | |
| Recommended docking flow | 0.17–0.33 l/s | |

* Regards circulating volume.

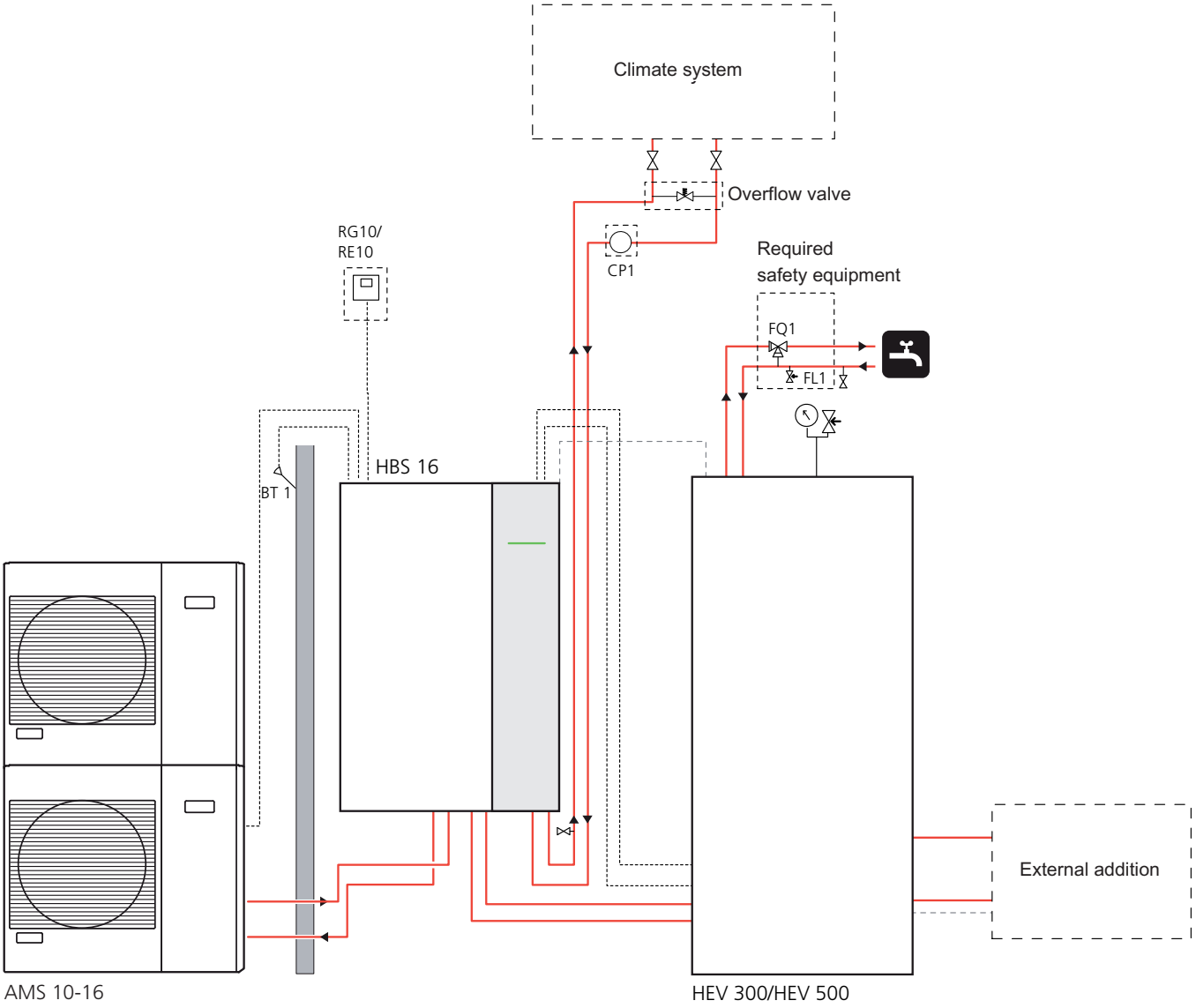
External circulation pump must be used when the pressure drop in the system is greater than the available external pressure. In such cases, a bypass line with non-return valve must be installed.

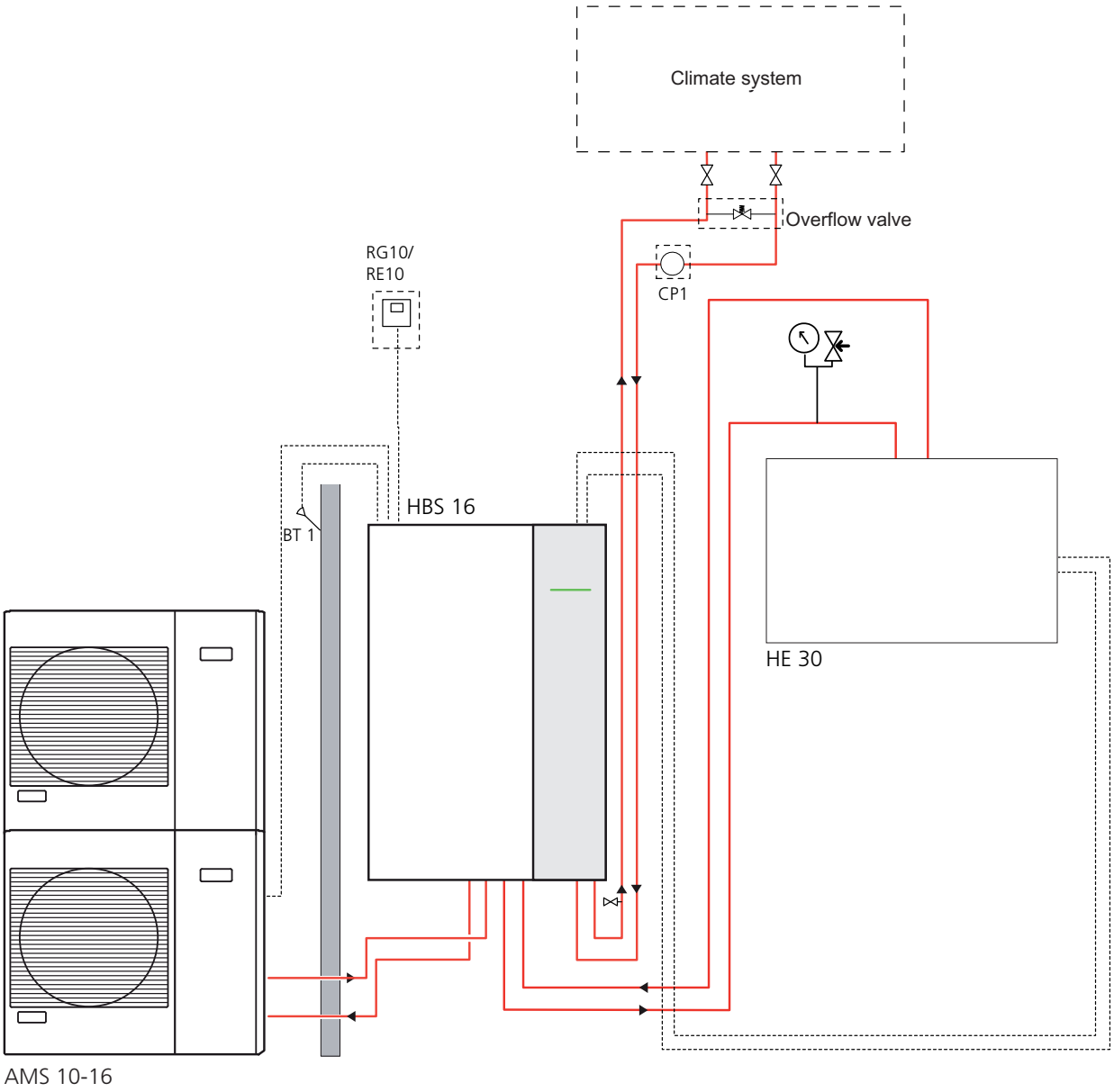
Overflow valve must be used if min. system flow cannot be guaranteed.

### Symbol key

| Symbol | Meaning |
|---|---|
| | Venting valve |
| | Shut-off valve |
| | Non-return valve |
| | Control valve |
| | Safety valve |
| | Temperature sensor |
| | Expansion vessel |
| Ⓟ | Pressure gauge |
| | Circulation pump |
| | Shunt / shuttle valve |
| | Fan |

**NIBE SPLIT with climate system and any addition**



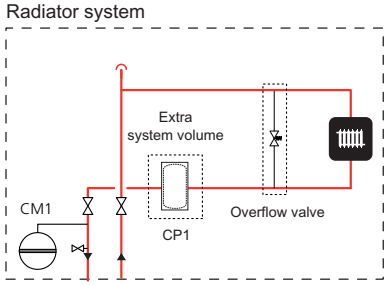



**NOTE**

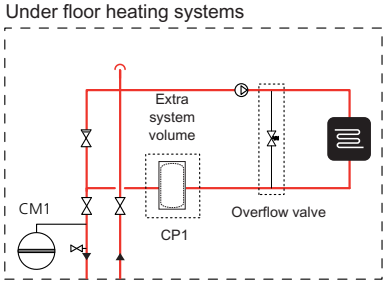
*These are outline diagrams. Actual installations must be planned according to applicable standards.*

## Climate system

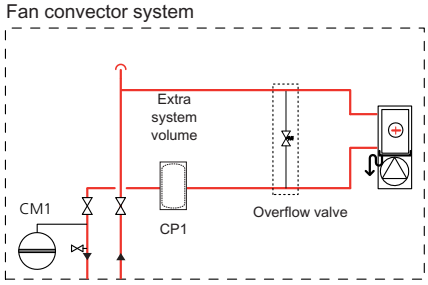
Radiator system



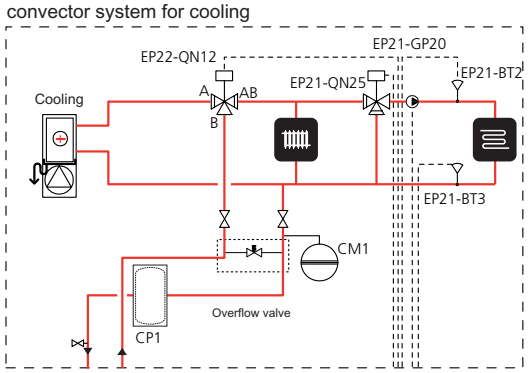

Under floor heating systems



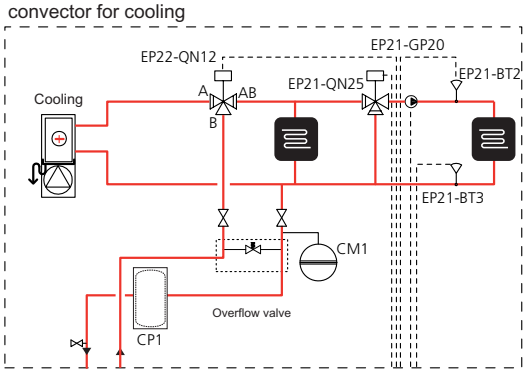

Fan convector system




Radiator and under floor heating for heating as well as fan convector system for cooling

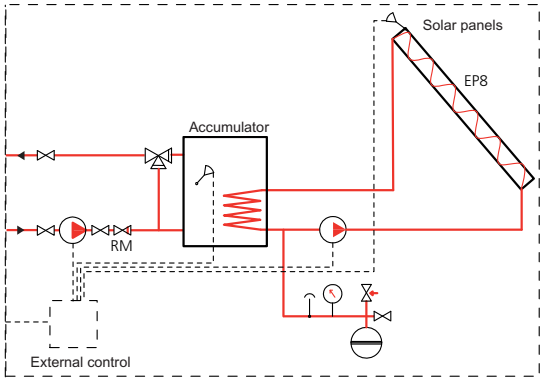



Double under floor heating system for heating and fan convector for cooling

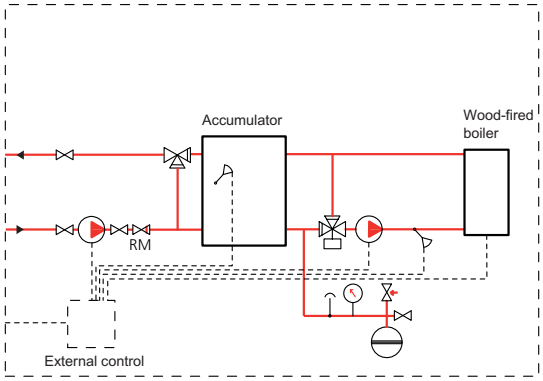



## External addition

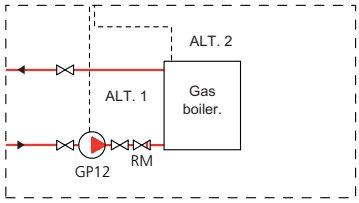
Solar panels



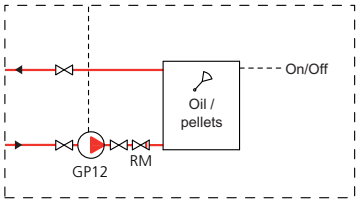

Wood boiler with accumulator



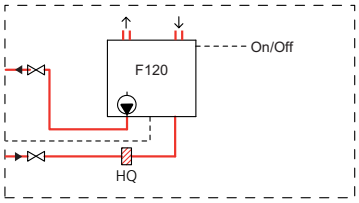

Gas boiler




Oil/pellet boiler




Exhaust air heat pump




## Explanation

**EP21 Climate system 2**
BT2 Temperature sensor, flow pipe
BT3 Temperature sensor, return
GP20 Circulation pump
QN25 Shunt valve

**EP22 Climate system 3**
QN12 Reversing valve, cooling/heating

**Miscellaneous**
BT1 Temperature sensor, outdoor
CM1 Expansion vessel
CP1 Buffer vessel UKV
GP10 Circulation pump
GP12 Charge pump
RM Non-return valve

# Electrical installation

## General

HBS 16 must be installed via an isolator switch with a minimum breaking gap of 3mm.

Other electrical equipment, except the outdoor sensors, current sensors and outdoor module AMS 10 is already connected at the factory.

- Disconnect the indoor module HBS 16 and outdoor module AMS 10 before insulation testing the house wiring.
- For fuse ratings, see technical data, "Fuse protection".
- If the building is equipped with an earth-fault breaker, HBS 16 should be equipped with a separate one.
- Connection must not be carried out without the permission of the electricity supplier and under the supervision of a qualified electrician.
- 3G6 mm$^2$ cable must be used for the connection between HBS 16 and AMS 10-16, for communication 3G1.5 mm$^2$ cable is used.
- Cables must be routed so that they are not damaged by metal edges or trapped by panels.
- AMS 10-16 is equipped with a single phase compressor. This means that phase L3 is loaded with up to 25 A during compressor operation.

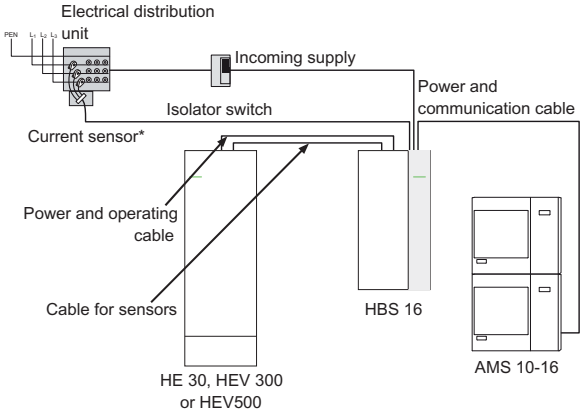
**NOTE**

*Electrical installation and service must be carried out under the supervision of a qualified electrician. Electrical installation and wiring must be carried out in accordance with the stipulations in force.*

**NOTE**

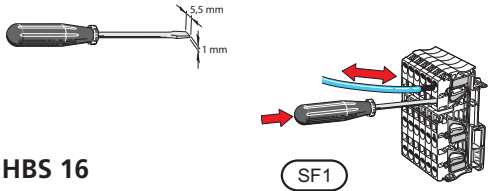
*The switch (SF1) must not be moved to "1" or "⚠" until the boiler has been filled with water. The circulation pump and immersion heater may become damaged.*

### Principle diagram, electrical installation

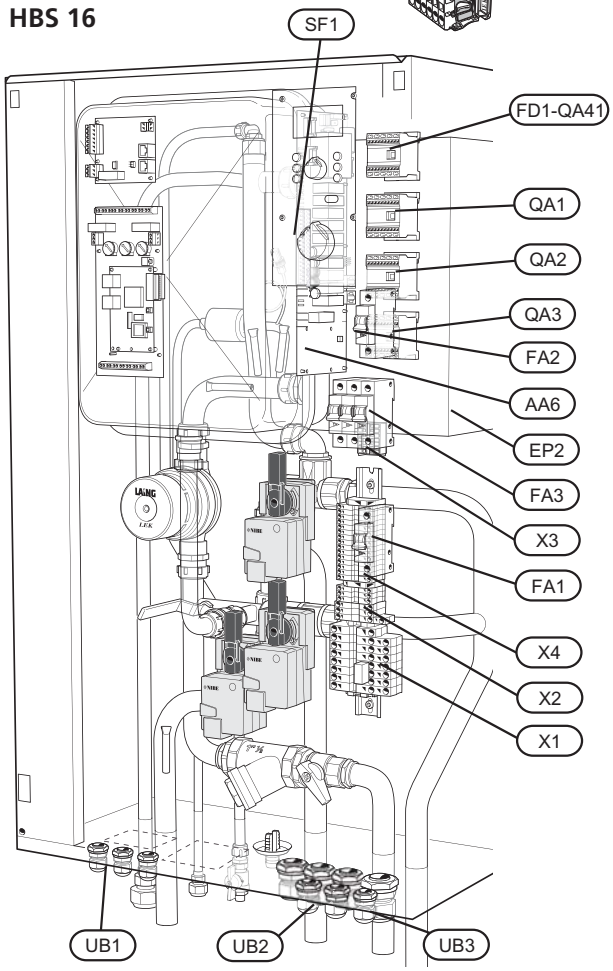



* Only in a 3-phase installation.

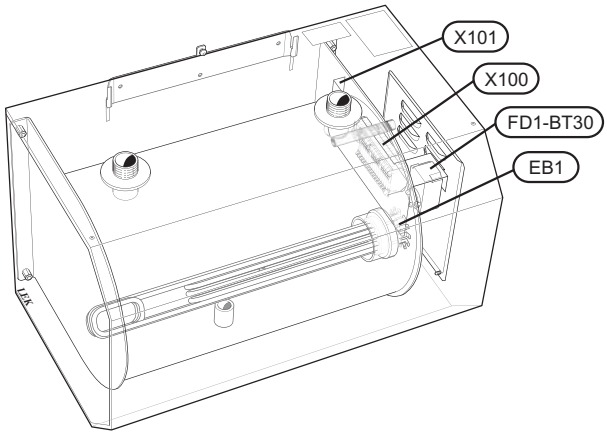
## Electrical components



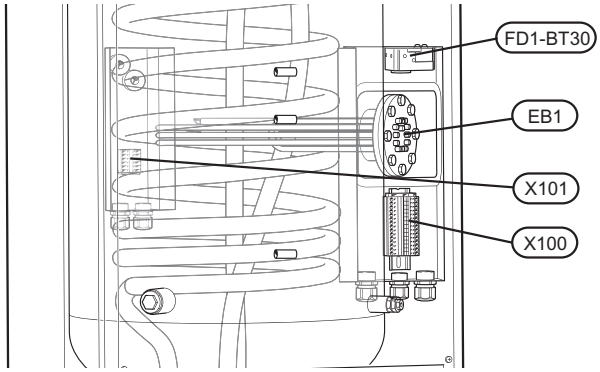

### HBS 16



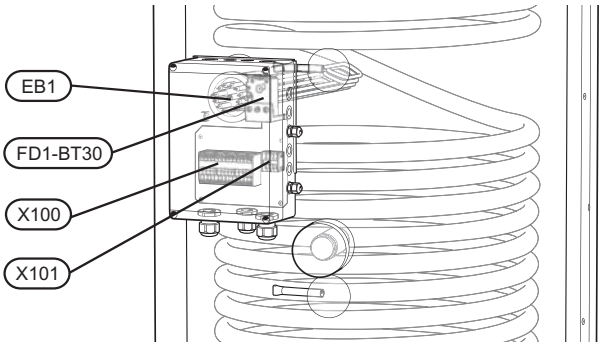

### HE 30




### HEV 300




### HEV 500




### Explanation

| Designation | Type | Scale length of conductor (mm) |
|---|---|---|
| UB1,2,3 | Cable gland | - |
| X1 | Terminal block, incoming mains supply | 18 |
| X2 | Terminal block, AMS 10-16 | 14 |
| | Terminal block, communication, AMS 10-16 | 12 |
| X3 | Terminal block, external addition | 9 |
| X4 | Terminal block, external immersion heater and temperature limiter/thermostat emergency mode FD1-BT30. | 12 |
| X100 | Terminal block | 12 |
| X101 | Terminal block | 9 |
| SF1 | Switch | - |
| FA1 | Miniature circuit breaker, control system | - |
| FA2 | Miniature circuit breaker, outdoor unit | - |
| FA3 | Miniature circuit breaker, external immersion heater | - |

## Connecting the supply

Incoming electricity supply is connected to terminal block (X1) in HBS 16 via cable gland (UB1). The cable must be dimensioned according to the applicable norms.

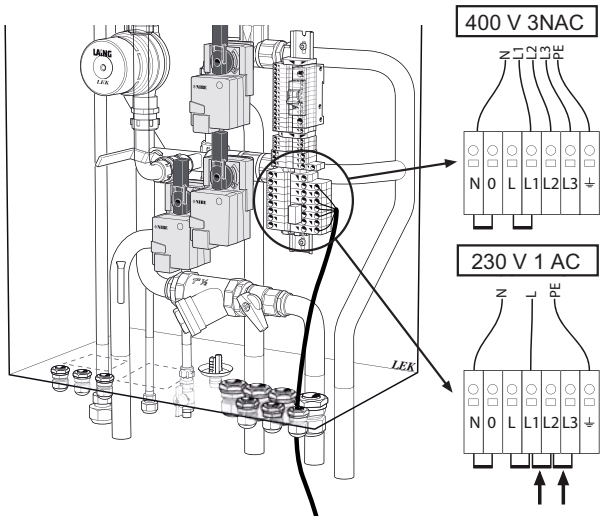
HBS 16 can be connected with either 400 V 3NAC or 230 V 1AC.

**400 V 3NAC**: Connect incoming supply according to the markings on terminal (X1).

**NOTE**

*Depending on the house main fuse and to avoid the load monitor slowing down the compressor, other loads in the house should be moved from L3 to L1 and L2.*

**230 V 1AC**: Install the supplied straps between terminals L1 and L2 as well as between L2 and L3 on incoming terminal block (X1). Connect incoming supply according to the terminal markings.




## Miniature circuit-breaker

The automatic heating control system, circulation pumps and their wiring in HBS 16, are internally fuse protected with a miniature circuit breaker (FA1).

Outdoor module AMS 10 and equipment are internally fuse protected in HBS 16, with a miniature circuit breaker (FA2).

## Temperature limiter

The temperature limiter (FD1) cuts the current supply to the electrical addition if the temperature rises between 90 and 100°C and can be manually reset.

### Resetting

The temperature limiter/emergency mode thermostat (FD1-BT30) is located in the tanks' electrical connections. The temperature limiter is reset by firmly pressing in its button.

**NOTE**

*Reset the temperature limiter, it may have tripped during transport.*

## Connection between HBS 16 and AMS 10-16

The cable between the units must be connected between terminal block for incoming supply (TB) in AMS 10-16 and terminal block (X2) in HBS 16 via cable gland (UB2).

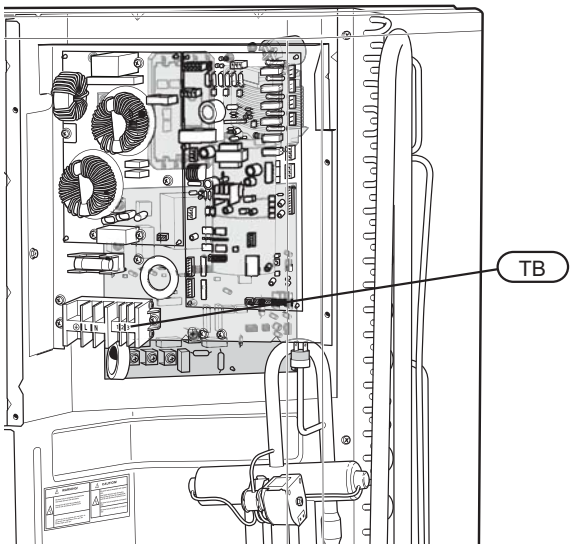
**NOTE**

*AMS 10-16 must be earthed before the wiring between the units is connected.*

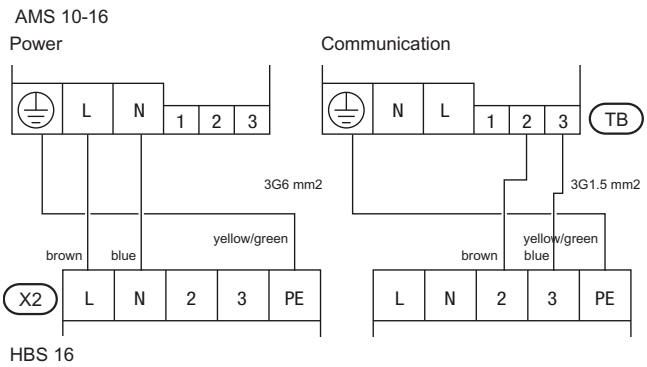
*The wiring must be attached so that the terminal block is not put under stress.*

*Scale length of conductor is 8 mm.*

**AMS 10-16**




Connect phase (brown), neutral (blue), as well as earth (yellow/green) as illustrated:

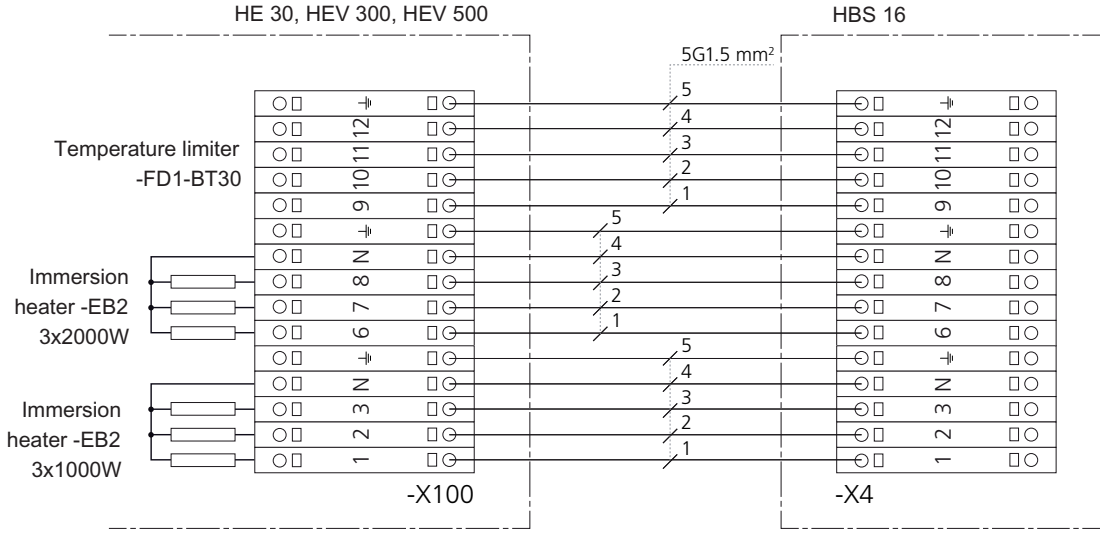


## Connection between HBS 16 and HE 30, HEV 300, HEV 500

The cable between the units must be connected between terminal block for outgoing electricity (X4) in HBS 16 and terminal block X100 in HE 30, HEV 300, HEV 500.

Scale length of conductor is 12 mm.

**Connection between HBS 16 and HE 30, HEV 300, HEV 500**




## Setting max power, electrical addition

Setting the different maximum immersion heater outputs is performed using the knob (R25) on the current limiter board (AA22). Set value displayed in menu 8.3.2. The following table only applies when menu 9.2.8 Add. heat type is set to "Internal power 1" (factory setting).

| Immersion heater, output (kW) | Knob position | Max. electric power | L1 (A) | L2 (A) | L3 (A) Compressor | |
|---|---|---|---|---|---|---|
| | | | | | on | off |
| 0.0 | - | 0 | 0 | 0 | 25 | 0 |
| 2.0 | - | 1 | 5.3 | 4.3 | 25 | 0 |
| 4.0 | A | 2 | 9.7 | 8.7 | 25 | 0 |
| 6.0 | B | 3 | 14 | 13 | 25 | 0 |
| 9.0 | C | 4 | 14 | 13 | - | 13 |

## Setting max boiler temperature

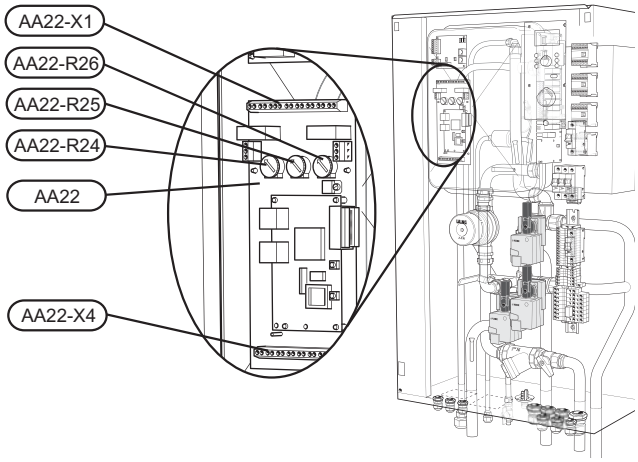
The setting of the different maximum boiler temperatures is made on the knob (R26) on the current limiter board (AA22). Set value displayed in menu 9.3.1.

| Boiler temperature | Knob position |
|---|---|
| 55 | A |
| 60 | B |
| 65 | C |
| 65 | D |
| 65 | E |
| 65 | F |

## EBV board, terminal and wiring diagram

The following connections are made on the EBV board (AA22).

See page 72 for complete wiring diagram of board.




## Connecting the outside sensor

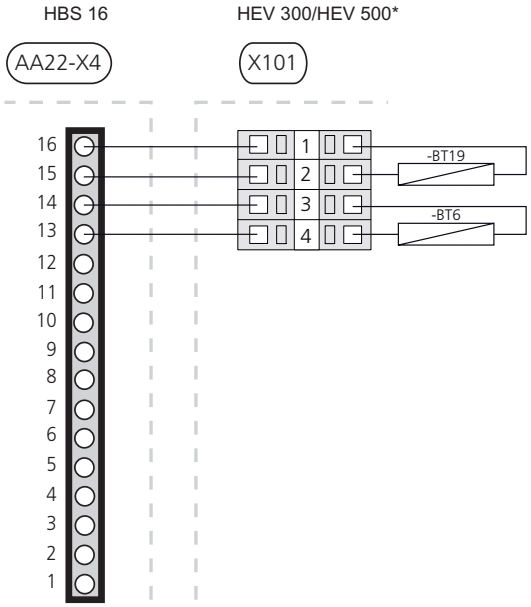
Install the outside temperature sensor (BT1) in the shade on a wall facing north or north-west, so it is unaffected by the morning sun. Connect the sensor to terminal block X1:1 and X1:2 on the current limiter board (AA22) via cable gland UB4. Use a 2 core cable of at least 0.5 mm$^2$.

If the outside sensor cable runs close to power cables, shielded cable must be used.

If a conduit is used it must be sealed to prevent condensation in the sensor capsule.

## Connecting the temperature sensor hot water charging

The water sensor (BT6) and immersion heater sensor (BT19) are located on HE 30/HEV 300/HEV 500 and are connected using a cable between HBS 16 (terminal block AA22-X4) and HE 30/HEV 300/HEV 500 (terminal block X101). Use a 4 core cable of at least 0.5 mm2 cable area.




*The hot water sensor (BT6) is not used in HE 30.

## Connecting the current limiter

**NOTE**

*Only applies to 3X400V.*

When many power consumers are connected in the property at the same time as the electric addition is operating, there is a risk of the property's main fuse tripping. HBS 16 is equipped with an integrated current limiter that controls the electrical steps and the compressor. If necessary, the electrical steps are disengaged and/or the compressor frequency is reduced.

A current sensor should be installed on each incoming phase conductor in to the distribution box to measure the current. The distribution box is an appropriate installation point.

Connect the current sensors to a multi-core cable in an enclosure next to the distribution box. Use unscreened multi-core cable of at least 0.50 mm$^2$, from the enclosure to HBS 16.

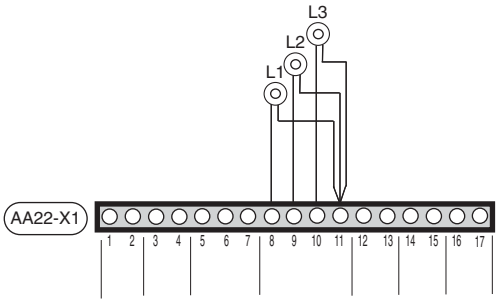
In HBS 16 connect the cable to the current limiter board (AA22) on terminal X1:8–11.

L1 connects on X1:8 and X1:11.

L2 connects on X1:9 and X1:11.

L3 connects on X1:10 and X1:11.

X1:11 is the common terminal block for the three current sensors.




The size of the property's main fuse is set using the knob (R24) on the circuit limiter board, (AA22). The setting can be read in menu 8.3.1.

## Connection of centralised load control/tariff

In those cases centralised load control or tariff control is used this can be connected to the terminal block (X1) on the EBV card (AA22), which is positioned behind the front cover.

Tariff A, the electrical addition is disconnected. Connect a potential free contact function to terminal X1:5 and X1:7.

Tariff B, the compressor in AMS 10 is disconnected. Connect a potential free contact function to terminal X1:6 and X1:7.

Tariff A and Tariff B can be combined.

A closed contact results in the electrical output being disconnected.

## Connecting external contacts

### RG 10, sensor for changing the room temperature

An external sensor (BT50) can be connected to HBS 16 to change the flow temperature and with that set the room temperature, for example, a room sensor (RG 10, accessory). Connect the sensor to the terminal block from X4:1 to X4:3 on the current limiter board (AA22) according to wiring diagram.

Activated in menu 9.3.6.

The difference between the room temperature and the set room temperature affects the flow temperature. The required room temperature is set using the knob on RG 10 and is shown in menu 6.3.

### Contact for changing the room temperature

Climate system 1:

An external contact function can be connected to HBS 16 to change the flow temperature and in doing so change the room temperature, for example, a room thermostat or a timer. The contact must be potential free and non-locking and connected to terminal block X1:3 and X1:4 on the current limiter board (AA22).

When the contact is closed, the heating curve offset is changed by the number of steps shown here. The value is adjustable between -10 and +10. The value for the change is set in menu 2.4, "External adjustment".

Climate system 2:

An external contact function can be connected to HBS 16 to change the flow temperature and in doing so change the room temperature, for example, a room thermostat or a timer. The contact must be potential free and non-locking and connected to terminal block X1:14 and X1:15 on the current limiter board (AA22).

When the contact is closed, the heating curve offset is changed by the number of steps shown here. The value is adjustable between -10 and +10. The value for the change is set in menu 3.5, "External adjust. 2".

### Contact for activation of “Extra hot water”

An external contact function can be connected to HBS 16 for activation of the “Temporary extra hot water” function. The contact must be potential free and non-locking and connected to terminal block X6:1 and X6:2 on the current limiter board (AA22).

When the contact is closed for at least one second, the “Temporary Extra hot water” function is activated. An automatic return to the previously set function occurs after 3 hours.

## Alarm outputs

External indication of common alarms is possible through the relay function on the current limiter board (AA22), terminal block X2:1–2.

Electrical circuit diagram on page 72 shows the relay in the alarm position.

When switch (SF1) is in the "0" or “ ⚠ ” position the relay is in the alarm position.

## Docking specific connection

HBS 16 is prepared to control an external circulation pump (GP10), external shunt (QN11), exchange valve for cooling (QN12), as well as external addition e.g. oil, gas or pellets.

**External circulation pump (max 50W)**

Connect external circulation pump (GP10) to terminal block X3:1 (230 V), X3:4 (N) and X3:5 (PE).

The circulation pump (GP10) is active when the circulation pump (GP1) in HBS 16 is active.

The accessory HR 10 can be used if the connection output exceeds 50W. See section Component positions on page 80.

**External shunt (accessory)**

Connection and function are described in the Installation instructions for accessory ESV 28.

**Shuttle valve, cooling (accessory)**

Connection and function are described in the Installation instructions for accessory VCC 28.

**External addition**

HBS 16 can control an external addition.

Sensor BT19 must be moved to sensor output BT24 in the external additional heater (does not apply to solar power or wood fired docking). See section Component positions on page 80.

**Ext. 1 step**

1. Remove the strap on terminal block X3:2 and X3:3. See section Component positions on page 80 and section Electrical circuit diagram on page 72.
2. Connect the addition's phase to terminal block X3:2 (230 V) and X3:4 (N) (max 0.2 A).
3. Use the accessory HR10 when the need for potential for signal and/or when controlling external charge pumps.
4. Set "Ext. 1 step" in menu 9.2.8.

# Start-up and inspection

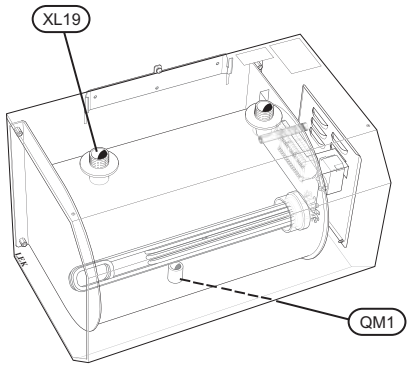
## Preparations

Connect AMS 10-16 to HBS 16 (refrigerant pipe and wiring) and connect HBS 16 to the climate system.

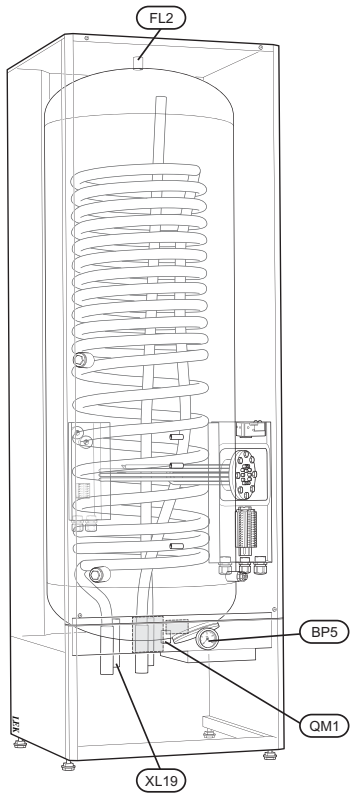
### Filling the climate system

1. Ensure that the pressure gauge (BP5) is visible.
2. Connect a hose to the filling valve (QM1) and open the valve to fill the tank and climate system.
3. After a while observe that the pressure on the manometer (BP5) rises.
4. When the pressure has reached about 0.25 MPa (2.5bar) a mix of air and water starts to emerge from the safety valve (FL2). Close the filling valve (QM1).

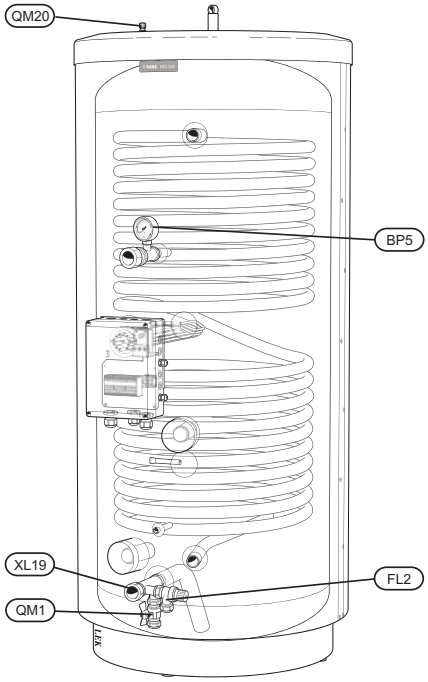
**HE 30**




**HEV 300**




**HEV 500**




### Venting the climate system

Bleed HBS 16 via the bleed valve (QM20), and the rest of the climate system via the relevant bleed valves.

Keep topping up and venting until all air has been removed and the correct pressure has been obtained.

### Filling the hot water coil

The hot water coil is filled by opening a hot water tap.

## Commissioning

**NOTE**

*Do not start AMS 10-16 at outdoor air temperatures of -20 °C or less.*

1. Check that the miniature circuit-breaker (FA2) in HBS 16 is on.
2. Check that the temperature limiter (FD1) has not tripped.
3. Switch on the main circuit breaker and check that the miniature circuit breaker (FA1) in HBS 16 is on.
4. Set switch (SF1) to "1" (the switch should be switched on for **6 hours** before the compressor can be started).

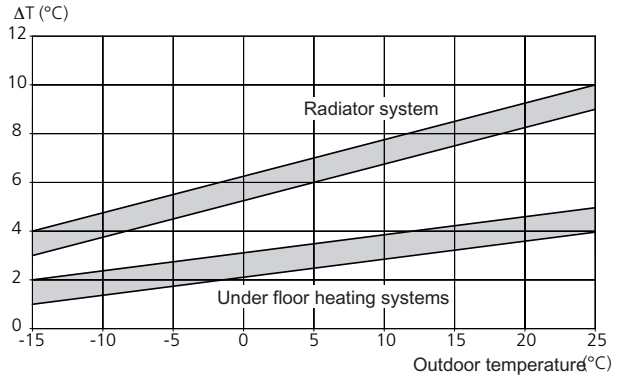
   When switch (SF1) is set to "0" - wait at least 1 minute before setting it back to "1".
5. Select operating mode "Add. heat only" by holding in the operating mode button for 7 seconds.
6. Set the date and time in menu 7.1 and 7.2.
7. Select "Service" in menu 8.1.1.
8. Select addition type in menu 9.2.8.

9. Set the fuse size on knob (R24). Check the value in menu 8.3.1.
10. Set the max immersion heater output on knob (R25). Check the value in menu 8.3.2.
11. Select the desired curve slope in menu 2.1.2 and set the parallel offset using the knob. Also see section Default setting on page 9.
12. Check that the hot water temperature in menu 1.0 exceeds 25 °C.
13. When point 11 has been carried out, select operating mode "Auto".

The heat pump starts after 30 minutes.

### Setting system flow heating

1. Ensure that the heat pump produces heating for the climate system.
2. Select "On" in menu 9.6.2.
3. Select "50" in menu 9.6.1.
4. Check the supply and return line temperatures in menu 2.5. Adjust the circulation pump speed in menu 2.1.5 so that the difference between these temperatures is according to the diagram below.
5. Select "Off" in menu 9.6.2.




### Setting system flow cooling

The factory setting 100% in menu 2.2.5 is recommended.

### Commissioning HBS 16 without AMS 10-16 connected

1. Check that the temperature limiter (FD1) has not tripped.
2. Switch on the main circuit breaker and check that the miniature circuit breaker (FA1) in HBS 16 is on.
3. Set switch (SF1) to "1".
4. Select operating mode "Add. heat only" by holding in the operating mode button for 7 seconds.
5. Set the date and time in menu 7.1 and 7.2.
6. Select "Service" in menu 8.1.1.
7. Select addition type in menu 9.2.8.
8. Set the fuse size on knob (R24). Check the value in menu 8.3.1.
9. Set the max immersion heater output on knob (R25). Check the value in menu 8.3.2.
10. Select the desired curve slope in menu 2.1.2 and set the parallel offset using the knob. Also see section Default setting on page 9.

### Checking external addition with internal immersion heater blocked

1. Select "Ext. 1 step" in menu 9.2.8.
2. Select operating mode "Add. heat only" by holding in the operating mode button for 7 seconds.
3. Ensure that the max temperature from the external addition does not exceed 65 °C.
4. Select operating mode "Auto" by pressing the operating mode button.

### Checking external addition (not controlled by HBS 16) with internal immersion heater as backup

1. Adjust the start temperature of the addition so that it starts at a higher temperature than the internal electrical addition (see set value in menu 1.2).
2. Adjust the addition's stop temperature so that the temperature in HBS 16 does not exceed 65 °C.

### Inspection of the installation

Current regulations require the heating installation to be inspected before it is commissioned. The inspection must be carried out by a suitably qualified person and should be documented. Use the check list on the following page. The above applies to closed climate systems.

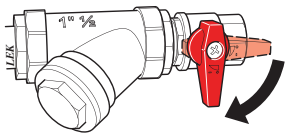
Do not replace any part of the split-system without carrying out new checks.

## Cleaning the particle filter

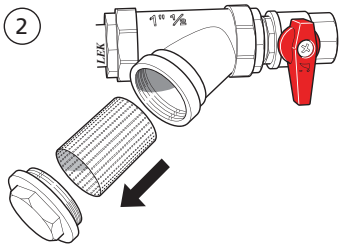
Clean the particle filter (HQ1) after installation.

1. Close valve QM31 and the valve by the particle filter (HQ1).
2. Open the bleed valve (QM20) to ensure that the pressure in HBS 16 falls.
3. Clean the particle filter (HQ1) as illustrated.

1



2



## Secondary adjustment

Air is initially released from the hot water and venting may be necessary. If gurgling sounds can be heard from HBS 16 or from the climate system, the entire system will require additional venting.

**NOTE**

*Use bleed valve (QM20), any external bleed valves as well as safety valve (FL2). The latter must be operated carefully as it opens quickly. When the system is stable (correct pressure and all air eliminated) the automatic heating control system can be set as required.*

*See Default setting on page 9.*

## Checklist: Checks before commissioning

| Hot water | Notes | Checked |
|---|---|---|
| Non-return valve | | ☐ |
| Safety valve | | ☐ |
| Mixing valve | | ☐ |
| Shut off valves | | ☐ |

| Heating | Notes | Checked |
|---|---|---|
| System volume | | ☐ |
| Expansion vessel | | ☐ |
| Safety valve | | ☐ |
| Internal addition | | ☐ |
| External addition | | ☐ |
| | | ☐ |

| Cooling | Notes | Checked |
|---|---|---|
| Pipe system, condensation insulation | | ☐ |
| Three way valve (QN12) cooling/heating | | ☐ |
| | | ☐ |

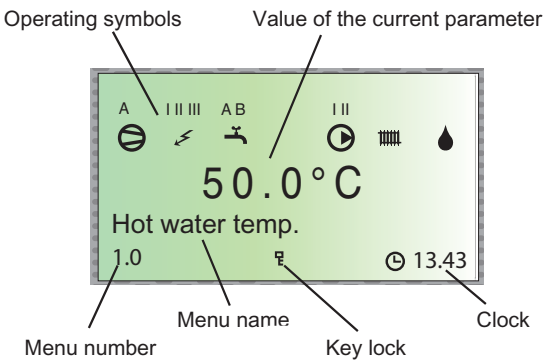
| Refrigerant system | Notes | Checked |
|---|---|---|
| Pipe length | | ☐ |
| Height difference | | ☐ |
| Pressurization test | | ☐ |
| Leak testing | | ☐ |
| End pressure vacuum | | ☐ |
| | | ☐ |

| Electrical installation | Notes | Checked |
|---|---|---|
| Property's main fuse | | ☐ |
| Group fuse | | ☐ |
| Current limiter/current sensor | | ☐ |
| | | ☐ |

| Accessories | Notes | Checked |
|---|---|---|
| External circulation pump | | ☐ |
| UKV | | ☐ |
| Overflow valve | | ☐ |
| Room sensor | | ☐ |
| Solar control | | ☐ |
| | | ☐ |

# Control

## Display




## Menu types

Control is divided into different menu types depending on how "deep" into the controls you need to go.

- Normal [N]: The settings you as a customer often need.
- Extended [U]: Shows all detailed menus except the service menus.
- Service [S]: Shows all menus.

**Changing of menu type is done from menu 8.1.1**

## Menu management

The Plus button is used to move forward to the next menu on the current menu level and to increase the value of the parameter in menus where this is possible.

The Minus button is used to move back to the previous menu on the current menu level and to decrease the value of the parameter in menus where this is possible.

The Enter button is used to select submenus of the current menu, to permit parameters to be changed and to confirm any changes to parameters. When the menu number ends with a zero this indicates that there is a submenu.

### Changing parameters

- Changing a parameter (value):
- Access the required menu.
- Press the enter button, the numerical value starts to flash.
- Increase or decrease using the Plus/Minus buttons.
- Confirm by pressing the enter button.
- Menu 1.0 is automatically displayed again 30 minutes after the last button press.

### Example

Changing the curve slope, menu 2.1.

- The starting point is menu 1.0.
- Press the plus button to move to menu 2.0.
- Press the enter button to move to menu 2.1.
- Press the enter button to change the value.
- Change the value by pressing the plus or minus buttons.
- Confirm the selected value by pressing the enter button.
- Press the quick movement button to access menu 1.0.

### Quick movement

To quickly return to the main menu from a sub menu, press one of the following buttons:

### Key lock

A key lock can be activated in the main menus by simultaneously pressing the plus and the minus buttons. The key symbol will then be shown on the display.

The same procedure is used to deactivate the key lock.

## Menu tree

| **1.0 [N] Hot water temp.** | |
|---|---|
| 1.1 [N] Max HW/Period time | |
| 1.2 [N] Start temperature HW | |
| 1.3 [N] Stop temperature HW | |
| 1.4 [U] Stop temperature XHW | |
| 1.5 [U] Heat pump stop XHW | |
| 1.7 [U] Interval XHW | |
| 1.8 [U] Next XHW action | |
| 1.9 [U] HW run time | |
| 1.10.0 [S] HW charge act/set | 1.10.1 [S] HW charge set temp |
| | 1.10.2 [S] Circ-pump speed HW |
| | 1.10.3 [S] Circ-pump manual |
| | 1.10.4 [S] HW reg min |
| | 1.10.5 [S] HW reg P |
| | 1.10.6 [S] HW reg Q |
| | 1.10.7 [S] HW reg sample time |
| | 1.10.8 [S] HW reg xP |
| | 1.10.9 [S] HW reg value for xP |
| | 1.10.10 [S] Return |
| 1.11.0 [S] CompFreq HW set-tings | 1.11.1 [S] CompFreq HW set |
| | 1.11.2 [S] CompFreq manual |
| | 1.11.3 [S] CompFreq at +20 |
| | 1.11.4 [S] CompFreq at -5 |
| | 1.11.5 [S] Return |
| 1.12 [N] Return | |

**2.0 [N] Supply temp.**

| | | |
|---|---|---|
| 2.1.0 [N] Heating settings | 2.1.1 [N] Offset heating/Total | |
| | 2.1.2 [N] Heating curve | |
| | 2.1.3.0 [U] Own heating curve | 2.1.3.1 [U] Supply temp.at +20 |
| | | 2.1.3.2 [U] Supply temp.at -20 |
| | | 2.1.3.3 [U] Buckling temperature |
| | | 2.1.3.4 [U] Supply t. at buckl. |
| | | 2.1.3.5 [U] Return |
| | 2.1.4 [U] Min supply heating | |
| | 2.1.5 [U] Circ-pump speed heat | |
| | 2.1.6 [N] Return | |
| 2.2.0 [N] Cooling settings | 2.2.1 [N] Offset cooling/Total | |
| | 2.2.2 [N] Cooling curve | |
| | 2.2.3.0 [U] Own cooling curve | 2.2.3.1 [U] Supply temp.at +20 |
| | | 2.2.3.2 [U] Supply temp.at +40 |
| | | 2.2.3.3 [U] Return |
| | 2.2.4 [U] Min supply cooling | |
| | 2.2.5 [U] Circ-pump speed cool | |
| | 2.2.6 [N] Return | |
| 2.3 [U] Max supply temp. | | |
| 2.4 [U] External adjustment | | |
| 2.5 [U] Supply/Return temp. | | |
| 2.6 [U] Degree minutes | | |
| 2.7 [N] Return | | |

| **3.0 [N] Supply temp. 2** | |
|---|---|
| 3.1 [N] Offset heating/Tot 2 | |
| 3.2 [N] Heating curve 2 | |
| 3.3 [U] Min supply temp. 2 | |
| 3.4 [U] Max supply temp. 2 | |
| 3.5 [U] External adjust. 2 | |
| 3.6.0 [U] Own heating curve 2 | 3.6.1 [U] Supply temp.at +20 |
| | 3.6.2 [U] Supply temp.at -20 |
| | 3.6.3 [U] Buckling temperature |
| | 3.6.4 [U] Supply t. at buckl |
| | 3.6.5 [U] Return |
| 3.7 [U] Supply/Return temp 2 | |
| 3.8 [N] Return | |

| **4.0 [N] Outdoor temp.** |
|---|
| 4.1 [N] Outdoor avg. temp. |
| 4.2 [U] Outdoor filter time |
| 4.3 [U] Outdoor avg. 1min. |
| 4.4 [N] Return |

| 5.0 [N] Heat pump | |
|---|---|
| 5.1 [N] Number of starts | |
| 5.2 [N] Run time compressor | |
| 5.3 [U] Time to start | |
| 5.4 [U] Outdoor temp. Tho-A | |
| 5.5 [U] Heat Ex Tho-R1 | |
| 5.6 [U] Heat Ex Tho-R2 | |
| 5.7 [U] Suction temp. Tho-S | |
| 5.8 [U] Hot gas Tho-D | |
| 5.9 [U] Liquid line temp. | |
| 5.10 [U] Condensor out / max | |
| 5.11 [U] HP | |
| 5.12 [U] LP LPT | |
| 5.13 [U] Fan speed | |
| 5.14.0 [U] CompFreq act/set | 5.14.1 [U] OU current CT |
| | 5.14.2 [U] Inverter temp Tho-IP |
| | 5.14.3 [U] Return |
| 5.15.0 [S] OU communication | 5.15.1 [S] Com. error rate |
| | 5.15.2 [S] Com. errors |
| | 5.15.3 [S] Reset com. errors |
| | 5.15.4 [S] Return |
| 5.16 [N] Return | |

| 6.0 [N] Room temperature* |
|---|
| 6.1 [U] Room compensation |
| 6.2 [U] Heating system |
| 6.3 [N] Room temp. setpoint |
| 6.4 [U] Room temp avg. 1min |
| 6.5 [U] Room integrator time |
| 6.6 [N] Return |

*Requires accessory and activation in menu 9.3.6.

| **7.0 [N] Clock** | |
|---|---|
| 7.1 [N] Date | |
| 7.2 [N] Time | |
| 7.3.0 [U] Temp set back | 7.3.1 [U] Set back time |
| | 7.3.2 [U] Set back temp +/- |
| | 7.3.3 [U] Heating system |
| | 7.3.4 [U] Return |
| 7.4.0 [U] Extra hot water | 7.4.1 [U] XHW Monday |
| | 7.4.2 [U] XHW Tuesday |
| | 7.4.3 [U] XHW Wednesday |
| | 7.4.4 [U] XHW Thursday |
| | 7.4.5 [U] XHW Friday |
| | 7.4.6 [U] XHW Saturday |
| | 7.4.7 [U] XHW Sunday |
| | 7.4.8 [U] Return |
| 7.5.0 [U] Vacation set back | 7.5.1 [U] Vacation begins |
| | 7.5.2 [U] Vacation ends |
| | 7.5.3 [U] Heating system |
| | 7.5.4 [U] Offset heating curve |
| | 7.5.5 [U] HW off |
| | 7.5.6 [U] Return |
| 7.6.0 [N] Silent mode | 7.6.1 [N] Silent mode time |
| | 7.6.2 [N] Return |
| 7.7 [N] Return | |

| **8.0 [N] Other adjustments** | |
|---|---|
| 8.1.0 [N] Display settings | 8.1.1 [N] Menu type |
| | 8.1.2 [N] Language |
| | 8.1.3 [N] Display contrast |
| | 8.1.4 [N] Light intensity |
| | 8.1.5 [N] Return |
| 8.2.0 [N] Op. mode settings | 8.2.1 [N] Allow add. heat |
| | 8.2.2 [N] Add. heat mode |
| | 8.2.3 [U] Stop temp. heating |
| | 8.2.4 [U] Start temp. cooling |
| | 8.2.5 [U] Hysteresis |
| | 8.2.6 [N] Return |
| 8.3.0 [U] Current limiter | 8.3.1 [U] Fuse size |
| | 8.3.2 [U] Max. electric power |
| | 8.3.3 [U] Current phase 1 |
| | 8.3.4 [U] Current phase 2 |
| | 8.3.5 [U] Current phase 3 |
| | 8.3.6 [U] Transform. ratio EBV |
| | 8.3.7 [U] Return |
| 8.5.0 [U] Period settings | 8.5.1 [U] Period time |
| | 8.5.2 [U] Max time for HW |
| | 8.5.3 [U] Return |
| 8.6 [N] Return | |

**9.0 [S] Service menus**

| | | |
|---|---|---|
| 9.1.0 [S] Heat pump settings | 9.1.1 [S] DM start heating | |
| | 9.1.2 [S] DM start cooling | |
| | 9.1.3 [S] Stop temp. heat low | |
| | 9.1.4 [S] Stop temp. heat high | |
| | 9.1.5 [S] Stop temp. cool low | |
| | 9.1.6 [S] Stop temp. cool high | |
| | 9.1.7 [S] Time bet. starts | |
| | 9.1.8 [S] Min CompFreq act/set | |
| | 9.1.9 [S] Max CompFreq act/set | |
| | 9.1.10 [S] OU current heat act/max | |
| | 9.1.11 [S] OU cur. cool act/max | |
| | 9.1.12 [S] Tank defrost Temp. | |
| | 9.1.13 [S] Return | |
| 9.2.0 [S] Add. heat settings | 9.2.1 [S] DM start add. heat | |
| | 9.2.2 [S] Time factor | |
| | 9.2.3 [S] Docking type | |
| | 9.2.4 [S] Reg. amplification | |
| | 9.2.5 [S] Reg. integrator time | |
| | 9.2.6 [S] Shunt amplification | |
| | 9.2.7 [S] Shunt amplification2 | |
| | 9.2.8 [S] Add. heat type | |
| | 9.2.9 [S] Return | |
| 9.3.0 [S] Operating settings | 9.3.1 [S] Max. boiler temp. | |
| | 9.3.2 [S] Logger | |
| | 9.3.3 [S] Cooling system | |
| | 9.3.4 [S] Heating system 2 | |
| | 9.3.5 [S] Room unit | |
| | 9.3.6 [S] Room sensor type | |
| | 9.3.7.0 [S] Forced control | 9.3.7.1 [S] Forced control |
| | | 9.3.7.2 [S] K1 |
| | | 9.3.7.3 [S] K2 |
| | | 9.3.7.4 [S] K3 |
| | | 9.3.7.5 [S] K4 |
| | | 9.3.7.6 [S] K5 |
| | | 9.3.7.7 [S] K6 |
| | | 9.3.7.8 [S] K7 |
| | | 9.3.7.9 [S] K8 |
| | | 9.3.7.10 [S] K9 |
| | | 9.3.7.11 [S] K10 |
| | | 9.3.7.12 [S] K11 |
| | | 9.3.7.13 [S] K12 |
| | | 9.3.7.14 [S] K13 |
| | | 9.3.7.15 [S] K14 |
| | | 9.3.7.16 [S] Alarm 1 |
| | | 9.3.7.17 [S] Alarm 2 |
| | | 9.3.7.18 [S] Return |
| | 9.3.8 [S] Factory setting | |

| **9.0 [S] Service menus** | | |
|---|---|---|
| | 9.3.9 [S] Operating state | |
| | 9.3.10.0 [S] Floor drying setting | 9.3.10.1 [S] Floor drying |
| | | 9.3.10.2 [S] Period time 1 |
| | | 9.3.10.3 [S] Temp. period 1 |
| | | 9.3.10.4 [S] Period time 2 |
| | | 9.3.10.5 [S] Temp. period 2 |
| | | 9.3.10.6 [S] Return |
| | 9.3.11 [S] Supply pump exer. | |
| | 9.3.12 [S] Supply diff HP | |
| | 9.3.13 [S] Diff HP add. heat | |
| | 9.3.14 [S] Block HW/Heating | |
| | 9.3.15 [S] Heat drop at alarm | |
| | 9.3.16 [S] Type of HW sensor | |
| | 9.3.17 [S] Freeze protection HX | |
| | 9.3.18 [S] Return | |
| 9.4 [S] Quick start | | |
| 9.5.0 [S] System info | 9.5.1 [S] Heat pump type | |
| | 9.5.2 [S] Cpu usage percent | |
| | 9.5.3 [S] Com rate/1000 | |
| | 9.5.4 [S] Unit w. com. problem | |
| | 9.5.5 [S] Run time add. heat | |
| | 9.5.6 [S] Run time hot water | |
| | 9.5.7 [S] Program version | |
| | 9.5.8 [S] 106-card version | |
| | 9.5.9 [S] Display version | |
| | 9.5.10 [S] Relay card version | |
| | 9.5.11 [S] Lowest supply temp. | |
| | 9.5.12 [S] Percent runtime | |
| | 9.5.13 [S] Period | |
| | 9.5.14 [S] Run status | |
| | 9.5.15 [S] Run status last | |
| | 9.5.16 [S] Run status time | |
| | 9.5.17 [S] Return | |
| 9.6.0 [S] Heat reg. settings | 9.6.1 [S] CompFreq | |
| | 9.6.2 [S] Manual CompFreq | |
| | 9.6.3 [S] Max deltaF act/set | |
| | 9.6.4 [S] CompFreq regP | |
| | 9.6.5 [S] Time min freq start | |
| | 9.6.6 [S] Time min freq heat | |
| | 9.6.7 [S] Max diff flow-cFlow | |
| | 9.6.8 [S] CompFreq GMz | |
| | 9.6.9 [S] Return | |
| 9.7 [S] Reset alarm | | |
| 9.8.0 [S] Alarm log | 9.8.1.0 [S] Log 1 | 9.8.x.1 [S] Time |
| | | 9.8.x.2 [S] Alarm type |
| | | 9.8.x.3 [S] Run status |
| | | 9.8.x.4 [S] Run status last |

| 9.0 [S] Service menus | | |
|---|---|---|
| | | 9.8.x.5 [S] Run status time |
| | | 9.8.x.6 [S] Run time compressor |
| | | 9.8.x.7 [S] Outdoor avg. 1min. |
| | | 9.8.x.8 [S] Outdoor temp Tho-A |
| | | 9.8.x.9 [S] Supply/Return temp |
| | | 9.8.x.10 [S] Condensor out |
| | | 9.8.x.11 [S] Hot water temp. |
| | | 9.8.x.12 [S] CompFreq act/set |
| | | 9.8.x.13 [S] Heat Ex Tho-R1 |
| | | 9.8.x.14 [S] Heat Ex Tho-R2 |
| | | 9.8.x.15 [S] Suction temp. Tho-S |
| | | 9.8.x.16 [S] Hot gas Tho-D |
| | | 9.8.x.17 [S] Liquid line temp. |
| | | 9.8.x.18 [S] HP |
| | | 9.8.x.19 [S] LP LPT |
| | | 9.8.x.20 [S] OU current CT |
| | | 9.8.x.21 [S] Inverter temp Tho-IP |
| | | 9.8.x.22 [S] Circ-pump speed |
| | | 9.8.x.23 [S] Relay status 1-8 |
| | | 9.8.x.24 [S] Relay status 9-14 |
| | | 9.8.x.25 [S] Program status 1-8 |
| | | 9.8.x.26 [S] Program status 9-16 |
| | | 9.8.x.27 [S] Return |
| | 9.8.2.0 [S] Log 2 | |
| | 9.8.3.0 [S] Log 3 | |
| | 9.8.4.0 [S] Log 4 | |
| | 9.8.5 [S] Clear alarm log | |
| | 9.8.6 [S] Return | |
| 9.9 [S] Return | | |

## Main menus

**Menu 1.0 [N] Hot water temp.**

The current hot water temperature in the hot water heater is shown here.

**Menu 2.0 [N] Supply temp.**

The current supply temperature for the climate system is shown here with the calculated supply temperature in brackets.

**Menu 3.0 [N] Supply temp. 2**

The current supply temperature for climate system 2 is shown here with the calculated supply temperature in brackets.

**Menu 4.0 [N] Outdoor temp.**

The current outdoor air temperature is displayed here.

**Menu 5.0 [N] Heat pump**

Readings regarding the status of the outdoor unit are shown in the sub-menus to this menu.

The following text appears in the display.

| Text | Means |
|---|---|
| Off | Shown when there is no compressor demand and none of the following apply. |
| On | Shown during normal operation with the compressor. |
| Initiates | Shown while the compressor is running. |
| Com. problem | Shown in the event of temporary communication problems. |
| Defrosting | Shown during defrost. |
| Oil return | Shown when the compressor is rotated to be lubricated. |
| Protection | Shown when the compressor is in some form of protection or during a start delay of 30 minutes. |
| Shutdown | Shown in the event of an alarm, tariff B or Operating mode Addition only. |
| Stopped | Shown when the outdoor temperature is outside the compressor's working range (too high or too low temperature). |

**Menu 6.0 [N] Room temperature**

The room temperature is shown here and the set room temperature in brackets. Settings concerning the factor for the room sensor and which climate system the sensor should control are made in the sub-menus for this menu.

**Menu 7.0 [N] Clock**

Settings regarding the date and time are made in the sub-menus of this menu. Different temperature reductions and increases at selected times are also set from this menu.

**Menu 8.0 [N] Other adjustments**

Settings regarding the menu type, language, operating mode settings and load monitor reading are made in the sub-menus to this menu.

**Menu 9.0 [S] Service menus**

This menu and its sub-menus are only shown on the display screen when access has been selected in menu 8.1.1.

Values can be read and various settings can be made from these sub-menus.

**NOTE**

*These settings should only be made by persons with the necessary expertise.*

**[N]** Normal, covers the normal user's needs.

**[U]** Extended, shows all menus except the service menus.

**[S]** Service, shows all menus, returns to normal 30 minutes after the last button was pressed.

## 1.0 [N] Hot water temp.

**Menu 1.1 [N] Max HW/Period time**

The time of the hot water period and the time for the whole period are shown here. Shown for both hot water charging and heating when necessary:

Time Heating/Max. when heating is in progress.

Time Hot water/Max. if hot water charging is in progress.

**Menu 1.2 [N] Start temperature HW**

The temperature when the heat pump starts hot water charging is set here.

Setting range: 25 – 55 °C

Default value: 47 °C

**Menu 1.3 [N] Stop temperature HW**

The temperature when the heat pump stops hot water charging is set here.

Setting range: 30 – 60 °C

Default value: 53 °C

**Menu 1.4 [U] Stop temperature XHW**

The desired temperature during extra hot water is set here.

Setting range: 40 – 65 °C

Default value: 65 °C

**Menu 1.5 [U] Heat pump stop XHW**

The desired stop temperature during extra hot water for the heat pump is set here.

Setting range: 40 – 60 °C

Default value: 60 °C

**Menu 1.7 [U] Interval XHW**

Periodic time based extra hot water is selected here.

Extra hot water is shut off at the value "Off". Extra hot water is started when the value is confirmed.

Setting range: From - 90 days

Default value: Off

**Menu 1.8 [U] Next XHW action**

Next periodic increase to the "Extra hot water" level shown here.

**Menu 1.9 [U] HW run time**

Shows how long hot water charging with the compressor has been in progress (accumulated).

**Menu 1.10.0 [S] HW charge act/set**

Shows the actual and desired values for the hot water charging temperature.

Hot water charging settings are made in the sub-menus for this menu.

**Menu 1.10.1 [S] HW charge set temp**

Shows the actual set point value for the hot water charging temperature.

The set point value for temperatures above the stop value for hot water charging is selected within brackets.

Setting range: 0 – 10 °C

Default value: 2.0 °C

**Menu 1.10.2 [S] Circ-pump speed HW**

The speed of the heating medium pump during hot water charging is shown here.

**Menu 1.10.3 [S] Circ-pump manual**

Select "On" to manually control the HW pump.

Setting range: Off, On

Default value: Off

**Menu 1.10.4 [S] HW reg min**

Here you select the control signal that the heating medium pump is to start at.

Setting range: 1 – 50

Default value: 1

**Menu 1.10.5 [S] HW reg P**

P part for the HW pump regulator is selected here.

| | AMS 10-16 |
|---|---|
| Setting range | 0 – 127 |
| Factory setting | 13 |

**Menu 1.10.6 [S] HW reg Q**

Q part for the HW pump regulator is selected here.

Setting range: 0 – 127

Default value: 110

**Menu 1.10.7 [S] HW reg sample time**

The sample time for hot water charging is set here.

Setting range: 1 – 30

Default value: 5

**Menu 1.10.8 [S] HW reg xP**

Here you select the extra amplification that the heat pump regulator is to use after the breaking point.

Setting range: 1.0 – 10.0

Default value: 2.5

**Menu 1.10.9 [S] HW reg value for xP**

Here you select the breaking point when the flow is no longer linear to the control signal in the heating medium pump.

Setting range: 1 – 100

Default value: 40

**Menu 1.10.10 [S] Return**

Return to menu 1.10.0.

**Menu 1.11.0 [S] CompFreq HW settings**

The compressor frequency that is used during hot water charging is shown here.

Settings can be made regarding the compressor frequency during hot water charging in the submenus to this menu.

**Menu 1.11.1 [S] CompFreq HW set**

The compressor frequency for hot water charging is shown here.

Here you select the compressor frequency for hot water charging during manual control.

These setting initially apply when "On" is selected in menu 1.11.2.

| | AMS 10-16 |
|---|---|
| Setting range | 20 – 85 Hz |
| Factory setting | - |

**Menu 1.11.2 [S] CompFreq manual**

Select "On" to control the compressor frequency for hot water charging manually.

Setting range: Off, On

Default value: Off

**Menu 1.11.3 [S] CompFreq at +20**

The compressor frequency for hot water charging at an outdoor air temperature of 20 °C is selected here.

| | AMS 10-16 |
|---|---|
| Setting range | 20 – 85 Hz |
| Factory setting | 40 Hz |

**Menu 1.11.4 [S] CompFreq at -5**

The compressor frequency for hot water charging at an outdoor air temperature of -5 °C is selected here.

| | AMS 10-16 |
|---|---|
| Setting range | 20 – 85 Hz |
| Factory setting | 80 Hz |

**Menu 1.11.5 [S] Return**

Return to menu 1.11.0.

**Menu 1.12 [N] Return**

Return to menu 1.0.

## 2.0 [N] Supply temp.

**Menu 2.1.0 [N] Heating settings**

Heating settings are made in the sub-menus for this menu.

**Menu 2.1.1 [N] Offset heating/Total**

The selected heating curve offset is shown here.

The total offset of the heat curve is also shown here. It includes schedule, outer compensation and any room control.

**NOTE**

*The value is changed using the "Heating curve offset" knob.*

Setting range: -10 – 10

**Menu 2.1.2 [N] Heating curve**

The selected curve slope (heating curve) is shown here. At value 0, the function "Own heat curve" is activated, see menu 2.1.3.0.

Setting range: 0 – 20

Default value: 9

**Menu 2.1.3.0 [U] Own heating curve**

Here you can select your own curve definition. This is an individual linear curve with one break point. You select a break point and the associated temperatures.

**NOTE**

*The "Curve slope" in menu 2.1.2 must be set to 0 to activate this function.*

**Menu 2.1.3.1 [U] Supply temp.at +20**

The supply temperature at an outdoor air temperature of +20 °C is selected here.

Setting range: 0 – 80* °C

Default value: 20 °C

**Menu 2.1.3.2 [U] Supply temp.at -20**

The supply temperature at an outdoor air temperature of -20 °C is selected here.

Setting range: 0 – 80* °C

Default value: 35 °C

**Menu 2.1.3.3 [U] Buckling temperature**

Here you select at what outside air temperature the break point shall occur.

Setting range: -15 – 15 °C

Default value: 0 °C

**Menu 2.1.3.4 [U] Supply t. at buckl.**

You set the required flow temperature for the break point here.

Setting range: 0 – 80* °C

Default value: 30 °C

* Limited by menu 2.3 Max supply temp..

**Menu 2.1.3.5 [U] Return**

Return to menu 2.1.3.0.

**Menu 2.1.4 [U] Min supply heating**

The set minimum level for the supply temperature to the climate system is shown here.

The calculated flow temperature never drops below the set level irrespective of the outdoor temperature, curve slope or offset heating curve.

Setting range: 20 – 65 °C

Default value: 25 °C

**Menu 2.1.5 [U] Circ-pump speed heat**

The speed of the heating medium pump during house heating is selected here.

Setting range: 1 – 100

Default value: 100

**Menu 2.1.6 [N] Return**

Return to menu 2.1.0.

**Menu 2.2.0 [N] Cooling settings**

Cooling settings are made in the sub-menus for this menu.

**Menu 2.2.1 [N] Offset cooling/Total**

The selected cooling curve offset is changed here.

The total offset of the cooling curve is also shown here. It includes schedule, outer compensation and any room control.

Setting range: -10 – 10

Default value: -1

**Menu 2.2.2 [N] Cooling curve**

The selected curve slope (cooling curve) is shown here. At value 0, the function "Own cooling curve" is activated, see menu 2.2.3.0.

Setting range: 0 – 3

Default value: 1

**Menu 2.2.3.0 [U] Own cooling curve**

Here you can select your own curve definition.

**NOTE**

*The "Curve slope" in menu 2.2.2 must be set to 0 to activate this function.*

**Menu 2.2.3.1 [U] Supply temp.at +20**

The supply temperature at an outdoor air temperature of +20 °C is selected here.

Setting range: 0 – 25* °C

Default value: 20 °C

**Menu 2.2.3.2 [U] Supply temp.at +40**

The supply temperature at an outdoor air temperature of +40 °C is selected here.

Setting range: 0 – 25* °C

Default value: 10 °C

**Menu 2.2.3.3 [U] Return**

Return to menu 2.2.3.0.

**Menu 2.2.4 [N] Min supply cooling**

The set minimum level for the supply temperature to the climate system during cooling is shown here.

The calculated flow temperature never drops below the set level irrespective of the outdoor temperature, curve slope or offset heating curve.

Setting range: 18 – 25 °C

Default value: 18 °C

**Menu 2.2.5 [N] Circ-pump speed cool**

The speed of the heating medium pump during house cooling is selected here.

Setting range: 1 – 100

Default value: 100

**Menu 2.2.6 [N] Return**

Return to menu 2.2.0.

**Menu 2.3 [U] Max supply temp.**

The set maximum level for the supply temperature to the climate system is shown here.

The calculated flow temperature never exceeds the set level irrespective of the outdoor temperature, curve slope or offset heating curve.

Setting range: 25 – 65 °C

Default value: 55 °C

**Menu 2.4 [U] External adjustment**

Connecting an external contact, for example, a room thermostat (accessory) or a timer allows you to temporarily or periodically raise or lower the room temperature. When the external contact is closed, the heating curve offset is changed by the number of steps shown here.

If room control is active there is a degree change to the set room temperature.

Setting range: -10 – 10

Default value: 0

**Menu 2.5 [U] Supply/Return temp.**

The current actual flow and return line temperatures are shown here.

* Limited by menu 2.3 Max supply temp..

**Menu 2.6 [U] Degree minutes**

Current value for number of degree-minutes. For example, this value can be changed to accelerate the start of heating production or cooling.

Setting range: -32000 – 32000

**Menu 2.7 [N] Return**

Return to menu 2.0.

## 3.0 [N] Supply temp. 2

**Menu 3.1 [N] Offset heating/Tot 2**

The selected heating curve offset 2 is selected here.

The total offset of heat curve 2 is also shown here. It includes schedule, outer compensation and any room control.

Setting range: -10 – 10

Default value: -1

**Menu 3.2 [N] Heating curve 2**

The selected curve slope (heating curve) is shown here. At value 0, the function "Own heat curve 2" is activated, see menu 3.6.0.

Setting range: 0 – 20

Default value: 6

**Menu 3.3 [U] Min supply temp. 2**

The set minimum level for the supply temperature for climate system 2 is shown here.

The calculated flow temperature never drops below the set level irrespective of the outdoor temperature, curve slope or offset heating curve.

Setting range: 10 – 65 °C

Default value: 15 °C

**Menu 3.4 [U] Max supply temp. 2**

The set maximum level for the supply temperature for climate system 2 is shown here.

The calculated flow temperature never exceeds the set level irrespective of the outdoor temperature, curve slope or offset heating curve.

Setting range: 10 – 65 °C

Default value: 45 °C

**Menu 3.5 [U] External adjust. 2**

Connecting an external contact, for example, a room thermostat (accessory) or a timer allows you to temporarily or periodically raise or lower the room temperature. When the external contact is closed, the heating curve offset is changed by the number of steps shown here.

If room control is active there is a degree change to the set room temperature.

Setting range: -10 – 10

Default value: 0

**Menu 3.6.0 [U] Own heating curve 2**

Here you can select your own curve definition. This is an individual linear curve with one break point. You select a break point and the associated temperatures.

**NOTE**

*The "Curve slope" in menu 3.2 must be set to 0 to activate this function.*

**Menu 3.6.1 [U] Supply temp.at +20**

The supply temperature at an outdoor air temperature of +20 °C is selected here.

Setting range: 0 – 80* °C

Default value: 20 °C

**Menu 3.6.2 [U] Supply temp.at -20**

The supply temperature at an outdoor air temperature of -20 °C is selected here.

Setting range: 0 – 80* °C

Default value: 35 °C

**Menu 3.6.3 [U] Buckling temperature**

Here you select at what outside air temperature the break point shall occur.

Setting range: -15 – 15 °C

Default value: 0

**Menu 3.6.4 [U] Supply t. at buckl**

You set the required flow temperature for the break point here.

Setting range: 0 – 80* °C

Default value: 30 °C

**Menu 3.6.5 [U] Return**

Return to menu 3.6.0.

**Menu 3.7 [U] Supply/Return temp 2**

The present actual flow and return line temperatures for climate system 2 are shown here.

**Menu 3.8 [N] Return**

Return to menu 3.0.

## 4.0 [N] Outdoor temp.

**Menu 4.1 [N] Outdoor avg. temp.**

This menu shows the average outdoor temperature according to the set value in menu 4.2 (factory setting: 24h).

* Limited by menu 3.4 Max supply temp. 2.

**Menu 4.2 [U] Outdoor filter time**

Here you select during how long the average temperature in menu 4.1 is calculated.

Setting range: 1 min, 10 min, 1h, 2h, 4h, 6h, 12h, 24h

Default value: 24h

**Menu 4.3 [U] Outdoor avg. 1min.**

Shows the average outdoor temperature over the last minute.

**Menu 4.4 [N] Return**

Return to menu 4.0.

## 5.0 [N] Heat pump

**Menu 5.1 [N] Number of starts**

The accumulated number of starts with the compressor in AMS 10 is shown here.

**Menu 5.2 [N] Run time compressor**

The accumulated time that the compressor has been used in AMS 10 is shown here.

**Menu 5.3 [U] Time to start**

Time until the compressor start in the AMS 10 is shown in this menu.

**Menu 5.4 [U] Outdoor temp. Tho-A**

This menu shows the outdoor air temperature that the heat pump measures.

**Menu 5.5 [U] Heat Ex Tho-R1**

This menu shows the evaporator temperature in the heat pump at sensor Tho-R1.

**Menu 5.6 [U] Heat Ex Tho-R2**

This menu shows the evaporator temperature in the heat pump at sensor Tho-R2.

**Menu 5.7 [U] Suction temp. Tho-S**

This menu shows the suction gas temperature in the heat pump.

**Menu 5.8 [U] Hot gas Tho-D**

This menu shows the hotgas temperature in the heat pump.

**Menu 5.9 [U] Liquid line temp.**

This menu shows the liquid line temperature in the heat pump.

**Menu 5.10 [U] Condensor out / max**

Shows the current and max. allowed temperature after the condenser.

**Menu 5.11 [U] HP**

The current high pressure and corresponding temperature during heating are shown here. During cooling, the actual low pressure and corresponding temperature are shown.

**Menu 5.12 [U] LP LPT**

The current low pressure is shown here.

**Menu 5.13 [U] Fan speed**

No function.

**Menu 5.14.0 [U] CompFreq act/set**

The actual and set point value for the compressor frequency are shown here.

**Menu 5.14.1 [U] OU current CT**

The present phase current to AMS 10 is shown here.

**Menu 5.14.2 [U] Inverter temp Tho-IP**

The current inverter temperature is shown here.

**Menu 5.14.3 [U] Return**

Return to menu 5.14.0.

**Menu 5.15.0 [S] OU communication**

Readings regarding any communication errors can be made in the sub-menus to this menu.

**Menu 5.15.1 [S] Com. error rate**

Shows the percentage of incorrect communications with AMS 10 since start-up.

**Menu 5.15.2 [S] Com. errors**

Shows the total number of incorrect communications with AMS 10 since start-up.

**Menu 5.15.3 [S] Reset com. errors**

Select "Yes" here to reset the counters in menu 5.15.1 and 5.15.2. The settings returns to "No" once the action has been carried out.

Setting range: Yes, No

**Menu 5.15.4 [S] Return**

Return to menu 5.15.0.

**Menu 5.16 [N] Return**

Return to menu 5.0.

## 6.0 [N] Room temperature*

**Menu 6.1 [U] Room compensation**

A factor is selected here that determines how much the flow temperature is affected by the difference between the room temperature and the set room temperature. A higher value gives a greater change.

Setting range: 0 – 10.0

Default value: 2.0

**Menu 6.2 [U] Heating system**

Select here whether the room sensor should activate climate system 1 (menu 2.0) and/or climate system 2 (menu 3.0).

Setting range: Off, System 1, System 2, System 1+2

Default value: Off

*Requires accessory and activation in menu 9.3.6.

**Menu 6.3 [N] Room temp. setpoint**

The desired room temperature is shown here.

Setting range: 10 – 30 °C

**Menu 6.4 [U] Room temp avg. 1min**

Shows the average room temperature over the last minute.

**Menu 6.5 [U] Room integrator time**

Select the integration time for room control here.

Setting range: 0 – 120

Default value: 0

**Menu 6.6 [N] Return**

Return to menu 6.0.

## 7.0 [N] Clock

**Menu 7.1 [N] Date**

The current date is set here.

**Menu 7.2 [N] Time**

Here the current time is set.

**Menu 7.3.0 [U] Temp set back**

Settings, e.g. for night reduction can be selected in the sub-menus to this menu.

**Menu 7.3.1 [U] Set back time**

The time for the day change, e.g. night reduction is chosen here.

**Menu 7.3.2 [U] Set back temp +/-**

Changes to the heat curve with a day change, e.g. the night reduction is set here.

Setting range: -10 – 10

Default value: 0

**Menu 7.3.3 [U] Heating system**

The climate system that the day change is to affect is selected here. If shunt group 2 is present the menu can be set to "Off", "System 1", "System 2" or "System 1+2". In other cases only "Off" and "System 1" can be selected.

Setting range: Off, System 1, System 2, System 1+2

Default value: Off

**Menu 7.3.4 [U] Return**

Return to menu 7.3.0.

**Menu 7.4.0 [U] Extra hot water**

Settings are made in the sub-menus of this menu when extra hot water is required on a specific day.

**Menu 7.4.1 – 7.4.7 [U] XHW Monday – XHW Sunday**

Here you select the period for respective days when extra hot water should be activated. Hours and minutes for both start and stop are shown. Equal values mean that extra hot water is not activated. Time can be set past midnight.

Setting range: 00:00 – 23:45

Default value: 00:00 – 00:00

**Menu 7.4.8 [U] Return**

Return to menu 7.4.0.

**Menu 7.5.0 [U] Vacation set back**

Holiday settings are made in the sub-menus to this menu.

When the holiday function is active, the flow line temperature is reduced according to the setting and hot water charging can be switched off.

When the holiday function is deactivated, the heat pump heats the water for an hour, before periodic extra hot water is activated (if periodic extra hot water is activate din menu 1.7).

**NOTE**

*The holiday setting does not deactivate cooling.*

**Menu 7.5.1 [U] Vacation begins**

The start date for holiday changing is set here. The date is changed by pressing the enter button. The holiday change starts applying at 00:00 on the selected date.

Same date in menu 7.5.1 and 7.5.2 deactivates the holiday function.

**Menu 7.5.2 [U] Vacation ends**

The end date for holiday changing is set here. The date is changed by pressing the enter button. The holiday change stops applying at 23:59 on the selected date.

Same date in menu 7.5.1 and 7.5.2 deactivates the holiday function.

**Menu 7.5.3 [U] Heating system**

The climate system that the vacation set back is to affect is selected here. If shunt group 2 is present the menu can be set to "Off", "System 1", "System 2" or "System 1+2". In other cases only "Off" and "System 1" can be selected.

Setting range: Off, System 1, System 2, System 1+2

Default value: Off

**Menu 7.5.4 [U] Offset heating curve**

How much the heating curve is to be offset during the holiday period is set here.

If the relevant climate system has a room temperature sensor, the change is given in degrees.

Setting range: -10 – 10

Default value: -5

**Menu 7.5.5 [U] HW off**

If the hot water charge is to be shut off during the holiday period this is set here.

Setting range: No, Yes

Default value: Yes

**Menu 7.5.6 [U] Return**

Return to menu 7.5.0.

**Menu 7.6.0 [N] Silent mode**

The period for silent mode, where the heat pump operates at a lower noise level by limiting the compressor and fan speeds, is selected in the sub-menu.

**Menu 7.6.1 [N] Silent mode time**

The time interval for silent mode is set here. The period is selectable for a maximum of 23:45 (hh:mm) with increments of 15 min. If the same time is selected for stop and start the function is off.

Default values: off

**Menu 7.6.2 [N] Return**

Return to menu 7.6.0.

**Menu 7.7 [N] Return**

Return to menu 7.0.

## 8.0 [N] Other adjustments

**Menu 8.1.0 [N] Display settings**

Settings concerning language and menu type are set in the sub-menus to this menu.

**Menu 8.1.1 [N] Menu type**

The menu type is chosen here.

**[N]** Normal, covers the normal user's needs.

**[U]** Extended, shows all menus except the service menus.

**[S]** Service, shows all menus, returns to normal menu level 30 minutes after the last button was pressed.

**NOTE**

*Incorrect settings in the service menus can damage the property and/or heat pump.*

Setting range: N, U, S

Default value: N

**Menu 8.1.2 [N] Language**

Language settings are made here.

**Menu 8.1.3 [U] Display contrast**

The display's contrast is set here.

Setting range: 0 – 31

Default value: 20

**Menu 8.1.4 [U] Light intensity**

The light intensity in idle mode is set here. Idle mode starts 30 minutes after the last button was pushed.

Setting range: 0=off, 1=low, 2=average.

Default value: 1

**Menu 8.1.5 [N] Return**

Return to menu 8.1.0.

**Menu 8.2.0 [N] Op. mode settings**

Settings regarding auto mode can be made in the sub-menus to this menu.

**Menu 8.2.1 [N] Allow add. heat**

At which operating mode the electric addition is to be permitted to produce hot water and heat when needed is selected here.

Setting range: Off, Heating, Heating + Cooling, Cooling

Default values: Heating

**Menu 8.2.2 [N] Add. heat mode**

Selected if electric addition is to be used to produce hot water and heat.

Setting range: Off, On

Default value: Off

**Menu 8.2.3 [U] Stop temp. heating**

The average outdoor air temperature at which the heat pump (in auto mode) is to stop heat production.

When the average outdoor air temperature falls below Stop temp. heating – Hysteresis (menu 8.2.5) heating starts again.

Setting range: 1 – 43 °C

Default value: 17 °C

**Menu 8.2.4 [U] Start temp. cooling**

The average outdoor air temperature at which the heat pump (in auto mode) is to start cooling.

When the average outdoor temperature switches over, Start temp. cooling (menu 8.2.5) cooling starts.

When the average outdoor air temperature falls below Start temp. cooling – Hysteresis (menu 8.2.5) cooling stops.

Setting range: 10 – 43 °C

Default value: 25 °C

**Menu 8.2.5 [U] Hysteresis**

See menu 8.2.3 and menu 8.2.4. Also affects control with room sensor.

Setting range: 1.0 – 10.0

Default value: 1.0

**Menu 8.2.6 [N] Return**

Return to menu 8.2.0.

**Menu 8.3.0 [U] Current limiter**

Settings and readings regarding the load monitor are set in the sub-menus to this menu.

**Menu 8.3.1 [U] Fuse size**

The setting selected on the EBV card (AA22) knob (R24) is shown here.

**Menu 8.3.2 [U] Max. electric power**

The setting selected on the EBV card (AA22) knob (R25) is shown here.

**Menu 8.3.3 [U] Current phase 1**

Measured current from phase 1 shown here. If the value falls below 2.8 A "low" is displayed.

**Menu 8.3.4 [U] Current phase 2**

Measured current from phase 2 shown here. If the value falls below 2.8 A "low" is displayed.

**Menu 8.3.5 [U] Current phase 3**

Measured current from phase 3 shown here. If the value falls below 2.8 A "low" is displayed.

**Menu 8.3.6 [U] Transform. ratio EBV**

The transfer value must be defined depending on the current sensors used for the EBV card.

Setting range: 100 – 1250

Default value: 300

**Menu 8.3.7 [U] Return**

Return to menu 8.3.0.

**Menu 8.5.0 [U] Period settings**

Time periods for heating and hot water production are set in the sub-menus for this menu.

**Menu 8.5.1 [U] Period time**

The length of time for production of hot water and heating is set here.

Setting range: 5 – 60 min

Default value: 60 min

**Menu 8.5.2 [U] Max time for HW**

Here you select how much time of the period time (menu 8.5.1) is to be used to heat the hot water when there is a need for both heating and hot water.

Setting range: 0 – 60 min

Default value: 40 min

**Menu 8.5.3 [U] Return**

Return to menu 8.5.0.

**Menu 8.6 [N] Return**

Return to menu 8.0.

## 9.0 [S] Service menus

**Menu 9.1.0 [S] Heat pump settings**

Settings for AMS 10 are made in the sub-menus to this menu.

**Menu 9.1.1 [S] DM start heating**

Degree minute setting for start of heat pump, heating.

Setting range: -120 – 0

Default value: -60

**Menu 9.1.2 [S] DM start cooling**

Degree minute setting for start of heat pump, cooling.

Setting range: 0 – 120

Default value: 60

**Menu 9.1.3 [S] Stop temp. heat low**

Lower parameter for the heat pump's working range during heating. It stops below this outdoor air temperature.

The heat pump is permitted to start again when the outdoor air temperature increases by two degrees over the set value.

Setting range: -25 – 43 °C

Default value: -25 °C

**Menu 9.1.4 [S] Stop temp. heat high**

Upper parameter for the heat pump's working range during heating. It stops above this outdoor air temperature.

The heat pump is permitted to start again when the outdoor air temperature decreases by two degrees below the set value.

Setting range: -25 – 43 °C

Default value: 43 °C

**Menu 9.1.5 [S] Stop temp. cool low**

Lower parameter for the heat pump's working range during cooling. It stops below this outdoor air temperature.

The heat pump is permitted to start again when the outdoor air temperature increases by two degrees over the set value.

Setting range: 10 – 43 °C

Default value: 10 °C

**Menu 9.1.6 [S] Stop temp. cool high**

Upper parameter for the heat pump's working range during cooling. It stops above this outdoor air temperature.

The heat pump is permitted to start again when the outdoor air temperature decreases by two degrees below the set value.

Setting range: 10 – 43 °C

Default value: 43 °C

**Menu 9.1.7 [S] Time bet. starts**

Minimum time interval in minutes between compressor starts in the heat pump.

Setting range: 0 – 60 min

Default value: 0 min

**Menu 9.1.8 [S] Min CompFreq act/set**

Select the min compressor frequency here. Display of both the current and the set.

| | AMS 10-16 |
|---|---|
| Setting range | 20 – 77 Hz |
| Factory setting | 20 Hz |

**Menu 9.1.9 [S] Max CompFreq act/set**

Select here the max limit for the compressor. Display of the actual and set via the display.

| | AMS 10-16 |
|---|---|
| Setting range | 20 – 85 Hz |
| Factory setting | 85 Hz |

**Menu 9.1.10 [S] OU current heat act/max**

The phase current to AMS 10 and the highest permitted current that can be set during heating are shown here.

| | AMS 10-16 |
|---|---|
| Setting range | 7 – 25 |
| Factory setting | 24 |

**Menu 9.1.11 [S] OU cur. cool act/max**

The phase current to AMS 10 and the highest permitted current that can be set during cooling are shown here.

Setting range: 7 – 17

Default value: 15

| | AMS 10-16 |
|---|---|
| Setting range | 7 – 23 |
| Factory setting | 22 |

**Menu 9.1.12 [S] Tank defrost Temp.**

If the system is colder than the set value defrosting occurs connecting to HW. If HW is colder, the electrical addition starts.

Setting range: 20 – 30 °C

Default value: 20 °C

**Menu 9.1.13 [S] Return**

Return to menu 9.1.0.

**Menu 9.2.0 [S] Add. heat settings**

Settings regarding additional heat and shunt in HBS 16 and any extra shunt can be made in the sub-menus to this menu.

**Menu 9.2.1 [S] DM start add. heat**

The degree minute deficit that must be set before the additional heat supply is activated is set here.

Setting range: -1000 – -30

Default value: -400

**Menu 9.2.2 [S] Time factor**

The time factor of the immersion heater since first start up is shown here. The value is saved and is not reset even when the boiler is switched off using the main power switch.

**Menu 9.2.3 [S] Docking type**

No function.

**Menu 9.2.4 [S] Reg. amplification**

P section for additional control.

Setting range: 0 – 10.0

Default value: 1.5

**Menu 9.2.5 [S] Reg. integrator time**

I section for additional control.

Setting range: 5 – 60

Default value: 10

**Menu 9.2.6 [S] Shunt amplification**

Applies to shunt 1 (QN11). E.g. 2 degrees difference and 2 in amplification gives 4 sec/min controlling the shunt.

Setting range: 0.1 – 5.0

Default value: 1.0

**Menu 9.2.7 [S] Shunt amplification2**

Applies to any shunt 2 (accessory required). E.g. 2 degrees difference and 2 in amplification gives 4 sec/min controlling the shunt. This function compensates for the speed variation found on different shunt motors that may be installed.

Setting range: 0.1 – 5.0

Default value: 1.0

**Menu 9.2.8 [S] Add. heat type**

Select the type of addition to be used.

Setting range: Internal power 1, Ext. 1 step, Ext. Lin 3, Ext. Bin 3

Default values: Internal power 1

**Menu 9.2.9 [S] Return**

Return to menu 9.2.0.

**Menu 9.3.0 [S] Operating settings**

Settings regarding accessories, additional heat operation, floor drying and a return to the factory settings can be made in the sub-menus to this menu.

**Menu 9.3.1 [S] Max. boiler temp.**

The setting selected on the EBV card (AA22) knob (R26) is shown here.

**Menu 9.3.2 [S] Logger**

Select "On" here if logger is installed.

Setting range: Off, On

Default value: Off

**Menu 9.3.3 [S] Cooling system**

Select "On" if cooling system is installed (accessory required).

Setting range: Off, On

Default value: Off

**Menu 9.3.4 [S] Heating system 2**

Here you select how climate system 2 is installed and if "Off" is selected in menu 9.3.3 only "Off" or "Heat" can be selected (accessory required).

Setting range: Off, Heating, Heating + Cooling, Cooling

Default value: Off

**Menu 9.3.5 [S] Room unit**

Here you select whether the Room unit (RE 10) is to be activated or not (accessory required).

Setting range: Off, On

Default value: Off

**Menu 9.3.6 [S] Room sensor type**

Room sensor type is selected here. Menu 6.0 can be accessed.

Setting range: Off, RG10, RE10

Default value: Off

**Menu 9.3.7.0 [S] Forced control**

Settings regarding forced control of the relays in the heat pump are made from the sub-menus in this menu.

**Menu 9.3.7.1 [S] Forced control**

When "On" is selected in this menu, the user temporarily takes control of the relays in the heat pump. The setting automatically returns to "Off", 30 minutes after the last button was pushed or after a restart.

Setting range: Off, On

Default value: Off

**Menu 9.3.7.2 – 9.3.7.15 [S] K1 – K14**

Here you can select manual control of the relays.

Setting range: Off, On, Auto

Default value: Auto

**Menu 9.3.7.16 [S] Alarm 1**

Here you can select select manual test of alarm relay 1.

Setting range: Off, On, Auto

Default value: Auto

**Menu 9.3.7.17 [S] Alarm 2**

Here you can select select manual test of alarm relay 2.

Setting range: Off, On, Auto

Default value: Auto

**Menu 9.3.7.18 [S] Return**

Return to menu 9.3.7.0.

**Menu 9.3.8 [S] Factory setting**

Here you can select to restore factory settings in HBS 16.

When returning to the factory settings the language switches to English.

Setting range: Yes, No

Default value: No

**Menu 9.3.9 [S] Operating state**

Describes the operating status of HBS 16 and AMS 10.

*Shutdown:* Additional heater and heat pump are shutdown due to an alarm.

*Alternating:* The heat pump produces heat and switches, when necessary, between hot water and climate system.

*Combined Mode:* Due to a great heating demand, the addition is used for hot water and the heat pump produces heat. The addition assists, when necessary, with heat production.

*Cooling:* The heat pump produces cooling and switches between hot water and cooling system, when necessary.

*Super cooling:* Only cooling. This is carried out by the heat pump. Hot water produced by addition.

*Hot water:* Only hot water is produced. This is carried out by the heat pump.

*Addition:* The heat pump is off and both hot water and heat is produced by the addition.

**Menu 9.3.10.0 [S] Floor drying setting**

Settings for the floor drying program are made in the sub-menus to this menu.

**Menu 9.3.10.1 [S] Floor drying**

"On" or "Off" is selected for the floor drying program from this sub-menu. After time period 1 a switch is made to time period 2 followed by a return to the normal settings.

Setting range: Off, On

Default value: Off

**Menu 9.3.10.2 [S] Period time 1**

Selection of the number of days in period 1.

Setting range: 1 – 5 days

Default value: 3 days

**Menu 9.3.10.3 [S] Temp. period 1**

Selection of the flow temperature in period 1.

Setting range: 15 – 50 °C

Default value: 25 °C

**Menu 9.3.10.4 [S] Period time 2**

Selection of the number of days in period 2.

Setting range: 1 – 5 days

Default value: 1 days

**Menu 9.3.10.5 [S] Temp. period 2**

Selection of the flow temperature in period 2.

Setting range: 15 – 50 °C

Default value: 40 °C

**Menu 9.3.10.6 [S] Return**

Return to menu 9.3.10.0.

**Menu 9.3.11 [S] Supply pump exer.**

Pump operation can be deactivated here. Pump is in operation for 2 minutes, 12 hours after last operation.

Setting range: Off, On

Default value: On

**Menu 9.3.12 [S] Supply diff HP**

When the current flow temperature deviates from the set value compared to that calculated, the heat pump is forced to stop/start irrespective of the degree-minute figure.

*Heating mode:* If the current flow temperature exceeds the calculated flow with set value, the degree minute number is set to 1. The compressor stops when there is only a heating requirement.

If the calculated flow temperature drops below the calculated flow with set value, the degree minute number is set to the value in menu 9.1.1 minus 1. This means that the compressor will start.

*Cooling mode:* If the current supply temperature drops below the calculated supply with set value, the degree minute number is set to -1. The compressor stops when there is only a cooling requirement.

Setting range: 3 – 25 °C

Default value: 10 °C

**Menu 9.3.13 [S] Diff HP add. heat**

If additional heat is permitted (menu 8.2.1) and the current flow line temperature falls below the calculated set value plus the value from menu 9.3.12, the degree minute value is to the value in menu 9.2.1 plus 1 until the compressor has reached full speed. When the compressor has reached full speed, the degree minute value is set to the set value in menu 9.2.1 and addition is permitted. This means that the addition can cut in immediately.

Setting range: 1 – 8 °C

Default value: 3 °C

**Menu 9.3.14 [S] Block HW/Heating**

If heating or hot water are not required, they can be deselected here.

Operating mode Hot water or Only addition must be selected if heating is deselected.

Setting range: No HW, No heating, HW+Heating

Default value: HW+Heating

**Menu 9.3.15 [S] Heat drop at alarm**

Here you select whether heat production is to be reduced in the event of an alarm.

Setting range: Yes, No

Default value: Yes

**Menu 9.3.16 [S] Type of HW sensor**

Here you can select whether to use hot water sensors that manage higher temperatures (above 90 °C) or not.

*Standard:* Standard setting

*High temp:* Calculation for HW jacket sensor (BT6), Addition sensor (BT19) as well as supply sensor (BT2) arereplaced to suit a sensor that manages higher temperatures (up to 110 °C). Used if new sensor is installed in connection with installation of solar heating.

Setting range: Standard, High temp

Default value: Standard

**Menu 9.3.17 [S] Freeze protection HX**

Select here whether heat exchanger anti freeze is to be active or not.

Setting range: On, Off

Default value: On

**Menu 9.3.18 [S] Return**

Return to menu 9.3.0.

**Menu 9.4 [S] Quick start**

If "Yes" is selected, the compressor starts in the heat pump within 4 minutes if there is a demand. However, there is always a 30 minute compressor start delay if the current has been switched off.

Setting range: No, Yes

Default value: No

**Menu 9.5.0 [S] System info**

The sub menus to this menu contain information that is used when troubleshooting.

Only for service personnel.

**Menu 9.5.1 [S] Heat pump type**

The type of heat pump connected is shown here.

**Menu 9.5.2 [S] Cpu usage percent**

The CPU load is shown here.

**Menu 9.5.3 [S] Com rate/1000**

The number of communication retransmissions is shown here.

**Menu 9.5.4 [S] Unit w. com. problem**

Any communication problems that a unit may have are shown here as well as the relevant unit.

**Menu 9.5.5 [S] Run time add. heat**

The accumulated running time for the electric addition since the first start is shown.

**Menu 9.5.6 [S] Run time hot water**

The accumulated operating time in hours for hot water production with compressor since the first start-up is shown here.

**Menu 9.5.7 [S] Program version**

The current program software version in HBS 16 is shown here

**Menu 9.5.8 [S] 106-card version**

The communication card version number is shown here (AA23).

**Menu 9.5.9 [S] Display version**

The display version number is shown here.

**Menu 9.5.10 [S] Relay card version**

The relay card version number is shown here.

**Menu 9.5.11 [S] Lowest supply temp.**

The minimum flow line temperature since start-up is shown here.

**Menu 9.5.12 [S] Percent runtime**

The compressor's running time percentage.

**Menu 9.5.13 [S] Period**

Period counter for switching between hot water and heating/cooling.

**Menu 9.5.14 [S] Run status**

Shows the current operating status of AMS 10

The display can show: Off, Hot water, Heating, Cooling, Defrost, Oil return or XHW.

**Menu 9.5.15 [S] Run status last**

Shows the previous operating status for AMS 10

The display can show: Off, Hot water, Heating, Cooling, Defrost, Oil return or XHW.

**Menu 9.5.16 [S] Run status time**

The time since the last operating status change.

**Menu 9.5.17 [S] Return**

Return to menu 9.5.0.

**Menu 9.6.0 [S] Heat reg. settings**

Settings regarding the heating regulator can be made in the sub-menus to this menu.

**Menu 9.6.1 [S] CompFreq**

The current set point value frequency to the compressor is shown here.

Setting the set point during manual control of the compressor frequency is activated in menu 9.6.2.

| | **AMS 10-16** |
|---|---|
| Setting range | 20 – 85 Hz |

**Menu 9.6.2 [S] Manual CompFreq**

Select "On" to control the compressor frequency manually in menu 9.6.1.

Setting range: Off, On

Default value: Off

**Menu 9.6.3 [S] Max deltaF act/set**

The parameter for the heat regulator's max change of the set point is selected here.

Setting range: 1 – 10 Hz

Default value: 3 Hz

**Menu 9.6.4 [S] CompFreq regP**

Select P part for heat regulator.

Setting range: 1 – 60

Default value: 5

**Menu 9.6.5 [S] Time min freq start**

Select here the time that the compressor is to run at min speed, after start connecting to the climate system.

Setting range: 10 – 120 min

Default value: 70 min

**Menu 9.6.6 [S] Time min freq heat**

Select here the time that the compressor is to run at fixed frequency after shifting to heating. The compressor then runs at min frequency or at the frequency it had before hot water charging.

Setting range: 3 – 60 min

Default value: 3 min

**Menu 9.6.7 [S] Max diff flow-cFlow**

Select here limitation of flow when the degree minute regulator is way off the set point. Max difference between flow line front and calculated flow line.

Setting range: 2.0 – 10.0 °C

Default value: 4.0 °C

**Menu 9.6.8 [S] CompFreq GMz**

Here you select a value for the dynamic in the degree minute regulator.

Setting range: 95 – 127

Default value: 126

**Menu 9.6.9 [S] Return**

Return to menu 9.6.0.

**Menu 9.7 [S] Reset alarm**

Select "Yes" here to reset/acknowledge alarms in HBS 16. The settings returns to "No" once the action has been carried out.

Setting range: Yes, No

**Menu 9.8.0 [S] Alarm log**

The alarm logs with the last 4 alarms are shown in the sub-menus of this menu.

**Menu 9.8.1.0 – 9.8.4.0 [S] Log 1 – Log 4**

The alarm logs are shown in the sub-menus of this menu. Log 1 is the last alarm, log 2 the next to last, etc.

**Menu 9.8.x.1 [S] Time**

**Menu 9.8.x.2 [S] Alarm type**

See section Alarm list on page 67 for further alarm information.

| Alarm number | Cause |
|---|---|
| 1 | HP alarm |
| 2 | LP alarm |
| 3 | TB alarm |
| 4 | OU power failure |
| 5 | Low condenser out |
| 6 | High KF |
| 7 | Anti freeze HX |
| 8 | High HW temp. |
| 9 | High AH temp. |
| 10 | High VBF1 |
| 11 | High VBF2 |
| 12 | High VBR1 |
| 13 | High VBR2 |
| 15 | OU not compatible |
| 16 | Defrosting interrupted |
| 30 | Sensor fault UG |
| 31 | S. fault HP |
| 32 | Sensor fault KF |
| 33 | S. fault Liquid line |
| 34 | S. fault HW |
| 35 | S. fault AH |
| 36 | Sensor fault VBF1 |
| 37 | Sensor fault VBF2 |
| 38 | Sensor fault VBR1 |
| 39 | Sensor fault VBR2 |
| E34 | OU phase error |
| E35 | High HX temp |
| E36 | High hotgas |
| E37 | Sensor fault OU |
| E38 | Sensor fault OU |
| E39 | Sensor fault OU |
| E40 | HP alarm |
| E41 | Inverter error |
| E42 | Inverter error |
| E45 | Inverter error |
| E47 | Inverter error |
| E48 | Fan alarm |
| E49 | LP alarm |
| E51 | Inverter error |
| E53 | Sensor fault OU |
| E54 | LP alarm |
| E57 | Low refrigerant |
| E59 | Inverter error |

**Menu 9.8.x.3 [S] Run status**

**Menu 9.8.x.4 [S] Run status last**

**Menu 9.8.x.5 [S] Run status time**

**Menu 9.8.x.6 [S] Run time compressor**

**Menu 9.8.x.7 [S] Outdoor avg. 1min.**

**Menu 9.8.x.8 [S] Outdoor temp Tho-A**

**Menu 9.8.x.9 [S] Supply/Return temp**

**Menu 9.8.x.10 [S] Condensor out**

**Menu 9.8.x.11 [S] Hot water temp.**

**Menu 9.8.x.12 [S] CompFreq act/set**

**Menu 9.8.x.13 [S] Heat Ex Tho-R1**

**Menu 9.8.x.14 [S] Heat Ex Tho-R2**

**Menu 9.8.x.15 [S] Suction temp. Tho-S**

**Menu 9.8.x.16 [S] Hot gas Tho-D**

**Menu 9.8.x.17 [S] Liquid line temp.**

**Menu 9.8.x.18 [S] HP**

**Menu 9.8.x.19 [S] LP LPT**

**Menu 9.8.x.20 [S] OU current CT**

**Menu 9.8.x.21 [S] Inverter temp Tho-IP**

**Menu 9.8.x.22 [S] Circ-pump speed**

**Menu 9.8.x.23 [S] Relay status 1-8**

**Menu 9.8.x.24 [S] Relay status 9-14**

**Menu 9.8.x.25 [S] Program status 1-8**

**Menu 9.8.x.26 [S] Program status 9-16**

**Menu 9.8.x.27 [S] Return**

Return to menu 9.8.x.0.

**Menu 9.8.5 [S] Clear alarm log**

Select "Yes" to erase the entire alarm log. The settings returns to "No" once the action has been carried out.

Setting range: Yes, No

**Menu 9.8.6 [S] Return**

Return to menu 9.8.0.

**Menu 9.9 [S] Return**

Return to menu 9.0.

# Alarm list

## Acknowledging alarms

No harm in acknowledging an alarm. If the cause of the alarm remains, the alarm recurs.

- When an alarm has been triggered, it can be acknowledged in menu 9.7 (service menu) by switching HBS 16 off and on using the switch (SF1). Note that when the power is switched on there is a 30 minute delay before the heat pump restarts.
- When the alarm cannot be reset using the switch (SF1), the operating mode, "Add. heat only", can be activated to resume a normal temperature level in the house. This is most easily carried out by holding the "Operating mode" button in for 7 seconds.

**NOTE**

*Recurring alarms mean that there is a fault in the installation.*

## Alarm with automatic reset

| Alarm no. | Alarm text on the display | Triggers alarm | Resets alarm |
|---|---|---|---|
| 70 | Low condenser out | When condenser supply (BT12) is less than 5 °C. | - When condenser supply is greater than 14°C during cooling.<br>- When defrost has ended. If the defrost caused the alarm (condenser supply during defrost is approx. 10 °C). |
| 71 | High KF | When condenser supply is greater than 60 C and there are more than 120 seconds since shifting to the climate system. | - When condenser out is lower than 51 °C. |
| 72 | Anti freeze HX | When the low pressure is less than 0.65 MPa (6.5 bar) in cooling mode. | - When the low pressure is greater than 0.83 MPa (8.3 bar) and condenser out is greater than 14 degrees. |
| 73 | Freeze prot | When the outdoor temperature drops below 0 °C and the operating mode does not permit heating. | - When the outdoor temperature rises above 1 °C. |
| 75 | Current limit | Too high current output from the house. | - When the current output decreases. |
| 76 | Com. alarm | Failed communication to one or more boards. | - When the fault has been corrected. |
| 77 | Defrosting interrupted | When the temperature in the water heater is too low (low pressure is less than 0.5 MPa, 5.0 bar) during defrost. | - When defrost has ended. |
| 78 | Protection | Exceeded limit value | - When defrost has ended. |

## Temperature limiter alarm

The following alarm blocks both AMS 10 and addition.

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| 3 | TB alarm | Temperature limiter in the tank has tripped. | - The temperature limiter has tripped during transportation<br>- High temperature in the tank<br>- Blown circuit fuse (L2) |

## HBS 16 alarm

The following alarms block AMS 10. Addition runs at min permitted supply temperature.

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| 4 | OU power failure | No voltage to the outdoor unit from HBS 16. | - Blown circuit fuse (L3)<br>- Tripped miniature circuit breaker (-FA2) |
| 5 | Low condenser out | Too low temperature out from the condenser.<br>Occurs if alarm 70 occurs 3 times within an hour. | - Low temperature during cooling<br>- Low flow during cooling |

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| 6 | High KF | Too high temperature out from the condenser.<br>Occurs if alarm 71 occurs 3 times within an hour. | - Low flow in heating operation<br>- Too high set temperatures |
| 7 | Anti freeze HX | Anti-freeze of heat exchanger.<br>Occurs if alarm 72 occurs 3 times within an hour. | - Low flow during defrost<br>- Abnormally low temperature in the climate system |
| 14 | Defrosting interrupted | Occurs if the alarm 77 occurs 10 times in succession. | - Low flow during defrost<br>- Abnormally low temperature in the climate system<br>- Lack of refrigerant or leak |
| 15 | OU not compatible | Indoor unit and outdoor unit do not communicate with each other. | - Indoor unit and outdoor unit not compatible with each other. |
| 16 | Defrosting interrupted | Occurs if the alarm 78 occurs 10 times in succession. | - Low flow during defrost |
| 31 | S. fault HP | Sensor fault, high pressure (BP4). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work |
| 32 | Sensor fault KF | Sensor fault, cond out (BT12). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section) |
| 33 | S. fault Liquid line | Sensor fault, liquid line (BT15). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section) |

## AMS 10 alarm

The following alarms block AMS 10. Addition runs at min permitted supply temperature.

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| E5 | OU Com. error | Communication between the outdoor unit and HBS 16 is broken. There must be 22 volt direct current (DC) in the switch CNW2 on the control board (PWB1). | - Any isolator switches for AMS 10 off<br>- Incorrect cable routing |
| E35 | High HX temp | Temperature deviation on the hot gas sensor (Tho-R1/R2) five times within 60 minutes or under 60 minutes. | - Sensor does not work (see "Temperature sensor" section)<br>- Insufficient air circulation or blocked heat exchanger<br>- Defective control board in AMS 10<br>- Too much refrigerant |
| E36 | Permanent Hotgas | Temperature deviation on the hot gas sensor (Tho-D) two times within 60 minutes or under 60 minutes. | - Sensor does not work (see "Temperature sensor" section)<br>- Insufficient air circulation or blocked heat exchanger<br>- If the fault persists during cooling, there may be an insufficient amount of refrigerant.<br>- Defective control board in AMS 10 |
| E37 | S. fault Tho-R | Sensor fault, heat exchanger in AMS 10 (Tho-R). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section)<br>- Defective control board in AMS 10 |
| E38 | S. fault Tho-A | Sensor fault, outdoor sensor in AMS 10 (Tho-A). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section)<br>- Defective control board in AMS 10 |

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| E39 | S. fault Tho-D | Sensor fault, hot gas in AMS 10 (Tho-D). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section)<br>- Defective control board in AMS 10 |
| E40 | HP alarm | The high pressure pressostat (63H1) deployed 5 times within 60 minutes or under 60 minutes continuously. | - Insufficient air circulation or blocked heat exchanger<br>- Open circuit or short circuit on input for high pressure pressostat (63H1)<br>- Defective high pressure pressostat<br>- Expansion valve not correctly connected<br>- Service valve closed<br>- Defective control board in AMS 10<br>- Low or no flow during heating operation<br>- Defective circulation pump<br>- Defective fuse, F(4A) |
| E41 | Power transistor too hot | When IPM (Intelligent power module) displays FO-signal (Fault Output) five times during a 60-minute period. | Can occur when 15V power supply to the inverter PCB is unstable. |
| E42 | Inverter error | Voltage from the inverter outside the parameters four times within 30 minutes. | - Incoming power supply interference<br>- Service valve closed<br>- Insufficient amount of refrigerant<br>- Compressor fault<br>- Defective circuit board for inverter in AMS 10 |
| E45 | Inverter error | Communication between circuit board for inverter and control board broken. | - Open-circuit in connection between boards<br>- Defective circuit board for inverter in AMS 10<br>- Defective control board in AMS 10 |
| E47 | Inverter error | Overcurrent, Inverter A/F module | - Sudden power failure |
| E48 | Fan alarm | Deviations in the fan speed in AMS 10. | - The fan cannot rotate freely<br>- Defective control board in AMS 10<br>- Defective fan motor<br>- Control board in AMS 10 dirty<br>- Fuse (F2) blown |
| E49 | LP alarm | Too low value on the low pressure transmitter 3 times within 60 minutes. | - Open circuit or short circuit on input for low pressure transmitter<br>- Defective low pressure transmitter<br>- Defective control board in AMS 10<br>- Open circuit or short circuit on input for suction gas sensor (Tho-S)<br>- Defective suction gas sensor (Tho-S) |
| E51 | Inverter error | Continuous deviation on power transistor for 15 minutes. | - Defective fan motor<br>- Defective circuit board for inverter in AMS 10 |
| E53 | S. fault Tho-S | Sensor fault, suction gas in AMS 10 (Tho-S). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section)<br>- Defective control board in AMS 10 |

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| E54 | S. fault LPT | Sensor fault, low pressure transmitter in AMS 10. | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section)<br>- Defective control board in AMS 10<br>- Fault in the refrigerant circuit |
| E57 | Insufficient refrigerant | Insufficient refrigerant is detected upon start-up in cooling mode. | - Service valve closed<br>- Loose connection sensor (BT15, BT3)<br>- Defective sensor (BT15, BT3)<br>- Too little refrigerant |
| E59 | Inverter error | Failed start for compressor | - Defective circuit board for inverter in AMS 10<br>- Defective control board in AMS 10<br>- Compressor fault |

## Hot water alarm

The following alarms block hot water production via AMS 10. The addition is blocked completely.

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| 8 | High HW temp. | Too high temperature (>90 °C) on hot water sensor (BT6). | - Contactor to internal electricity defective<br>- Incorrect external addition setting |
| 9 | High AH temp. | Too high temperature (>90 °C) on immersion heater sensor (BT19). | - Contactor to internal electricity defective<br>- Incorrect external addition setting |
| 34 | S. fault HW | Sensor fault, hot water (BT6). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section) |
| 35 | S. fault AH | Sensor fault, immersion heater (BT19). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section) |

## Supply alarm

The following alarms switch off heating/cooling. Only hot water production is permitted.

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| 10 | High VBF1 | Too high temperature (>90 °C) on flow line sensor, system 1 (BT2). | - Sensor does not work (see "Temperature sensor" section) |
| 11 | High VBF2 | Too high temperature (>90 °C) on flow line sensor, system 2. | - Sensor does not work (see "Temperature sensor" section) |
| 36 | Sensor fault VBF1 | Sensor fault, supply, system 1 (BT2). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section) |
| 37 | Sensor fault VBF2 | Sensor fault, supply, system 2. | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section) |

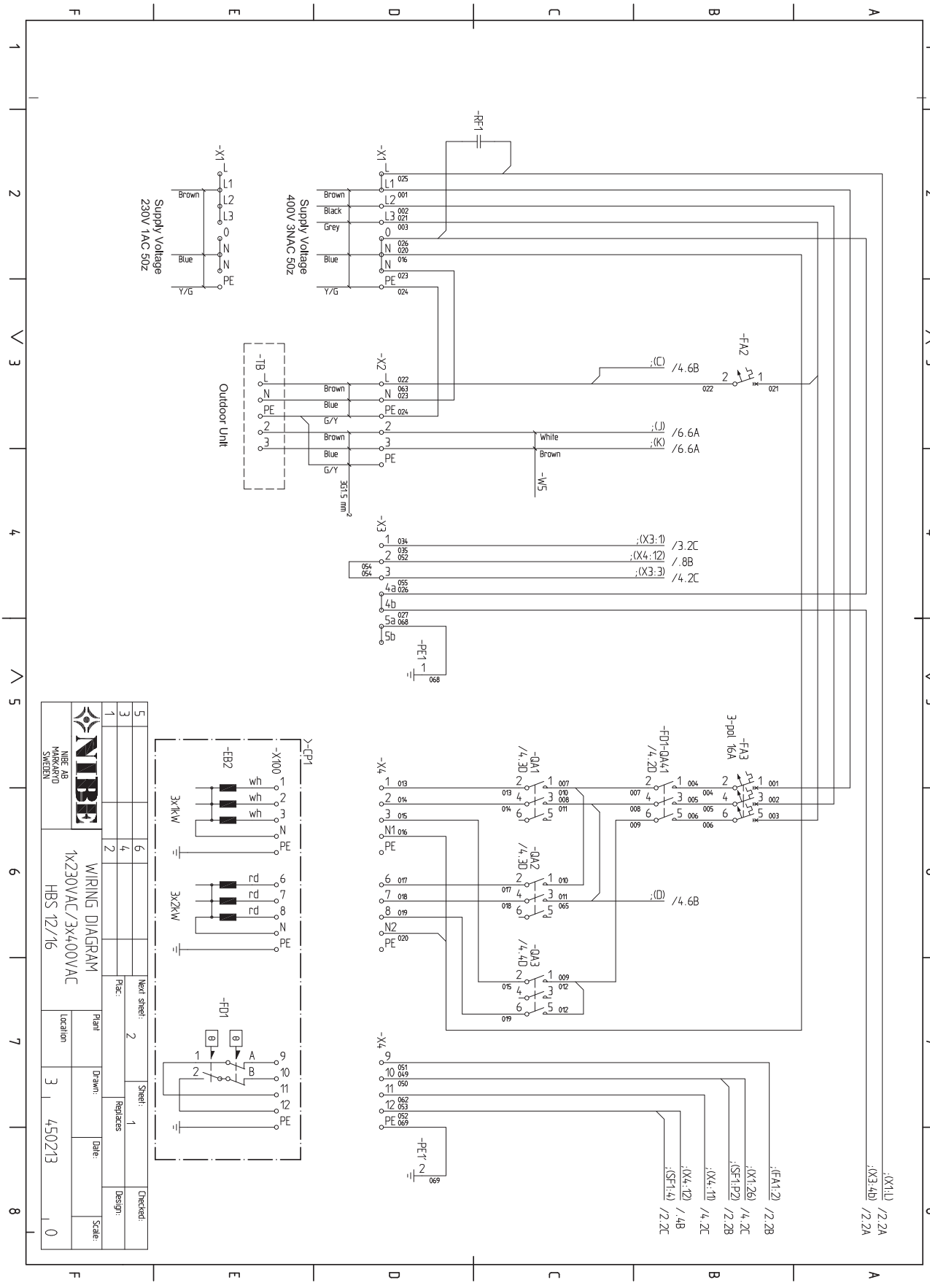
## Outdoor sensor alarm

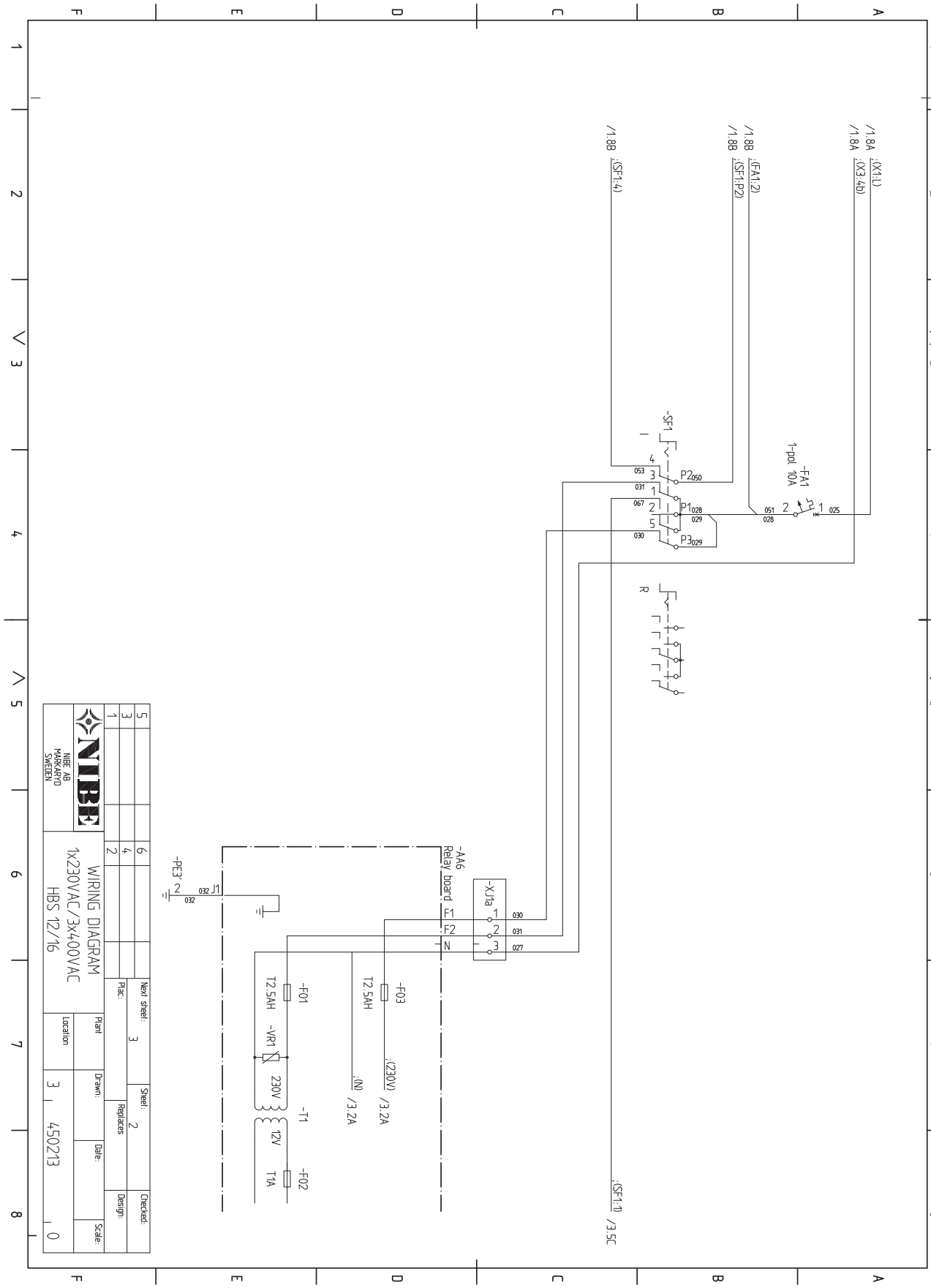
The following alarms set so that the system runs at minimum permitted supply temperature.

| Alarm no. | Alarm text on the display | Description | May be due to |
|---|---|---|---|
| 30 | Sensor fault UG | Sensor fault, outdoor temperature (BT1). | - Open-circuit or short-circuit on sensor input<br>- Sensor does not work (see "Temperature sensor" section) |

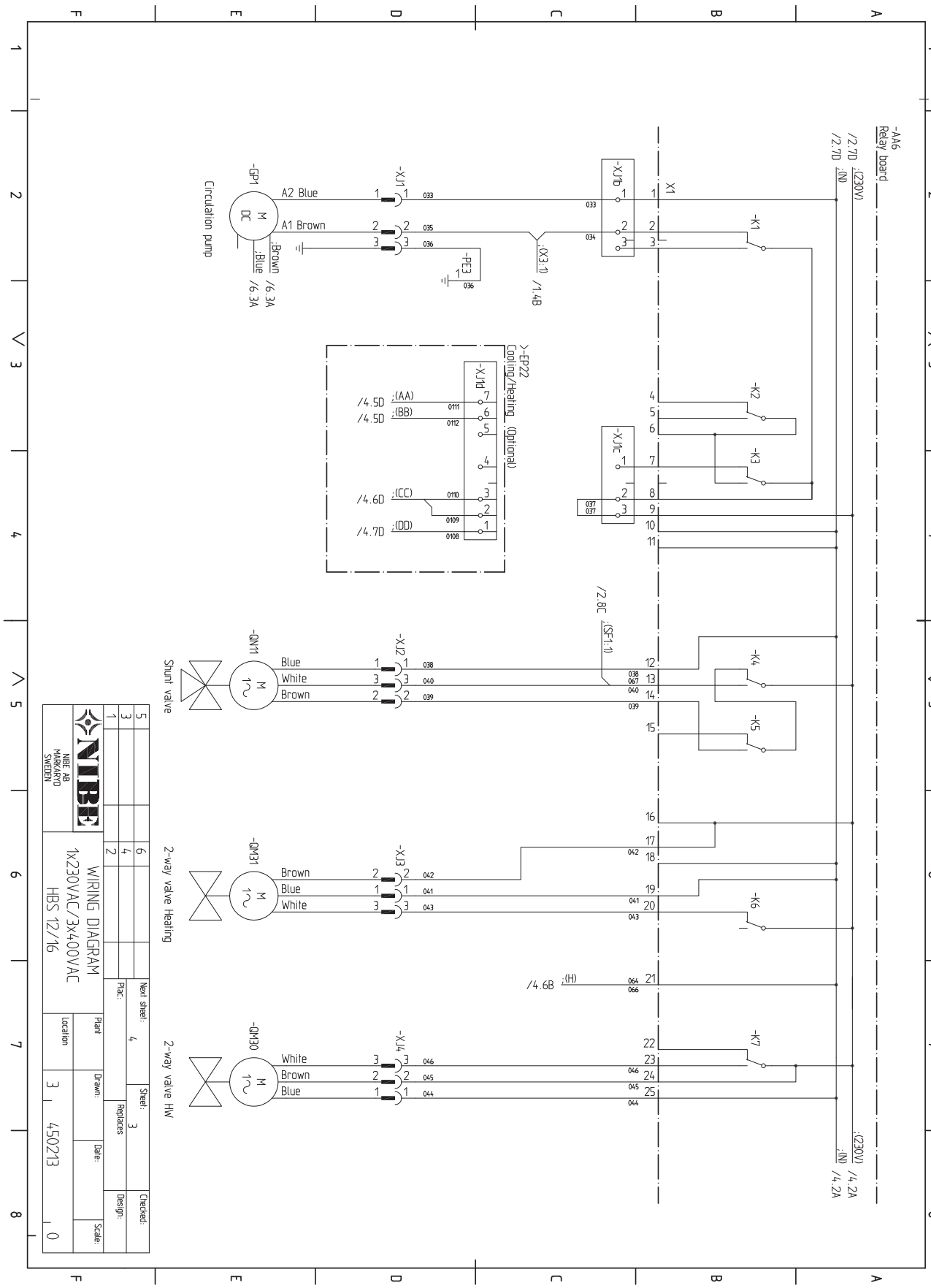
# Electrical circuit diagram

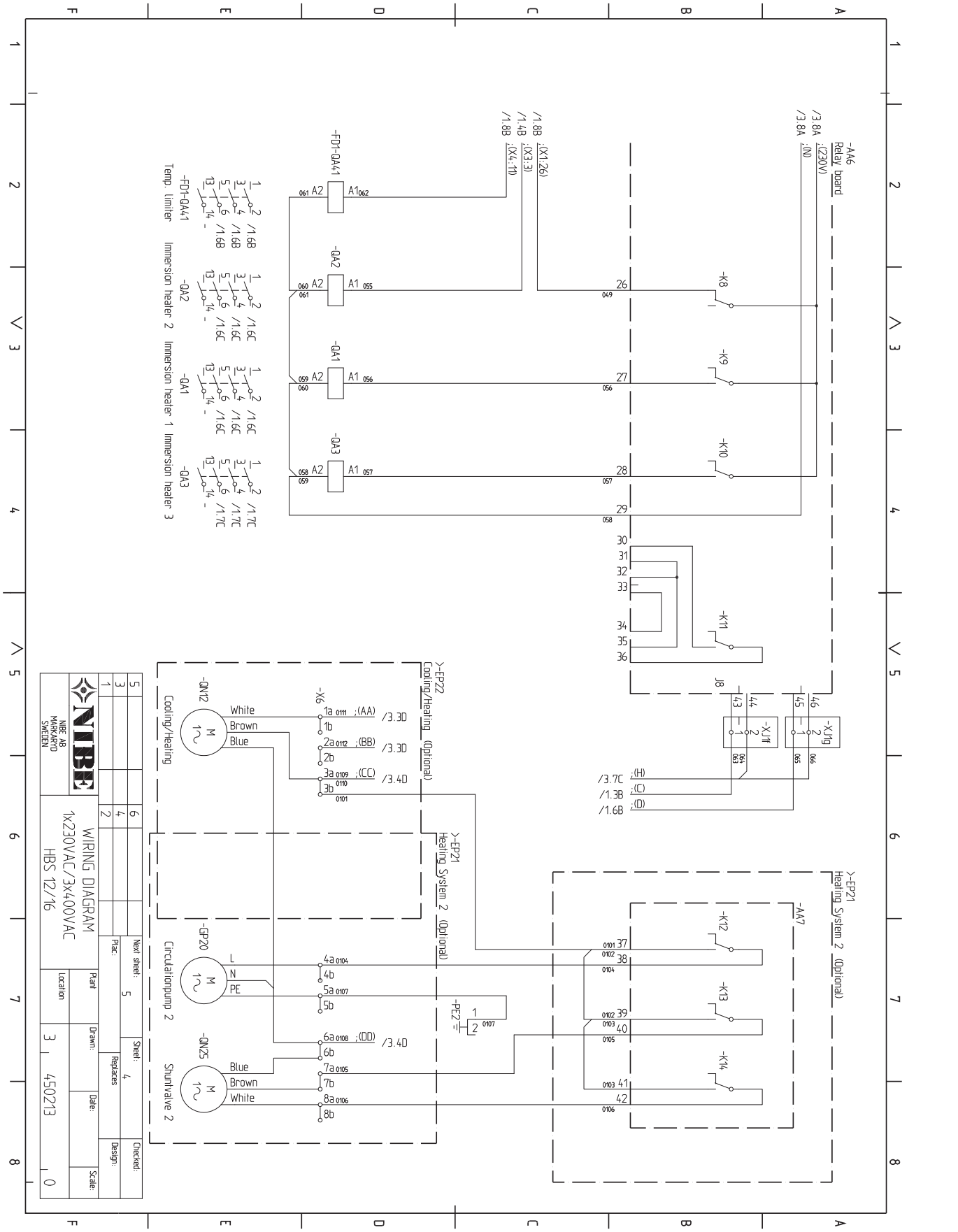
## HBS 16



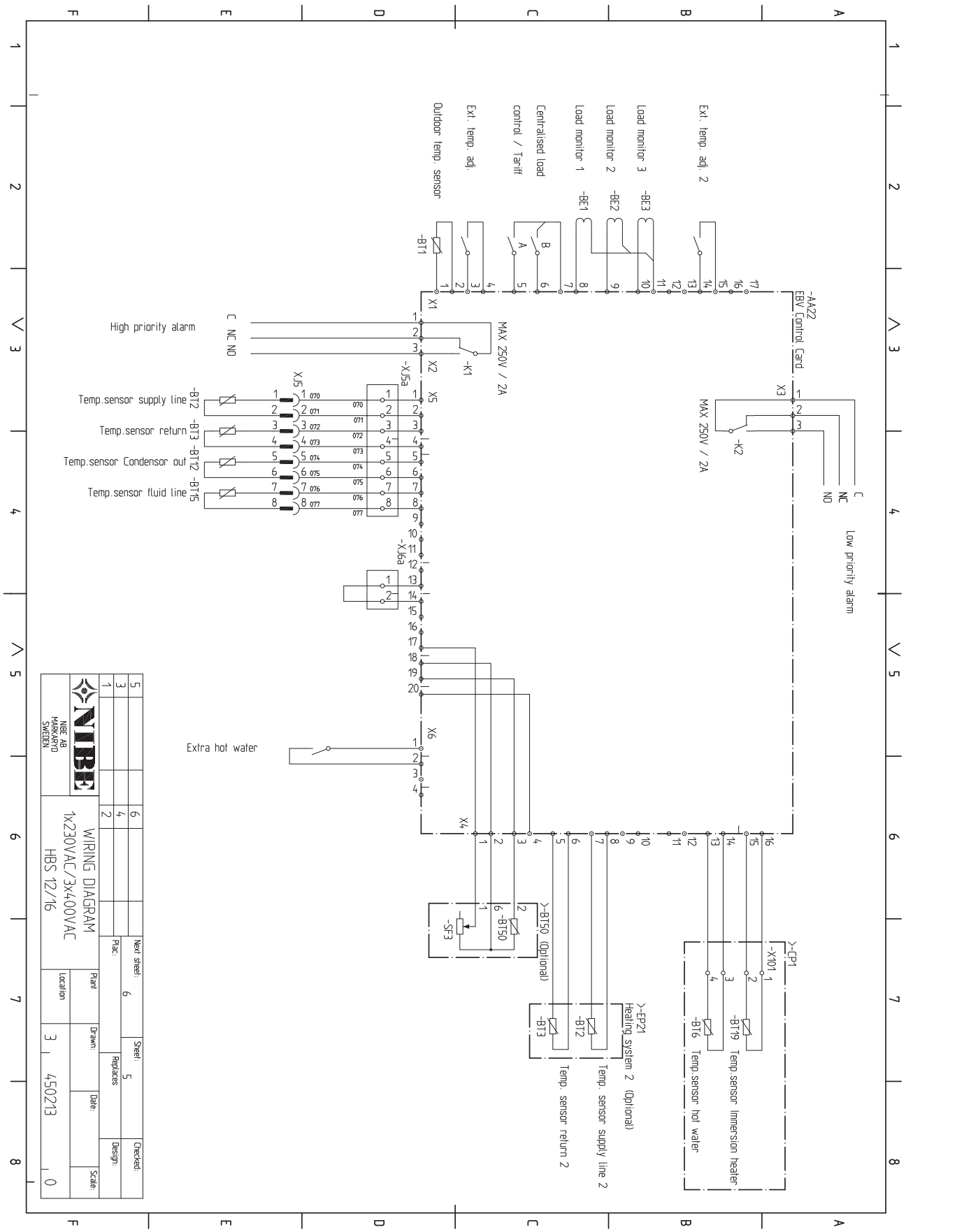

WIRING DIAGRAM
1x230VAC/3x400VAC
HBS 12/16
NIBE AB
MARKARYD
SWEDEN
450213
-SF1
-FA1
1-pol
10A
-AA6
Relay board
-X1a
-PE3
-F01
T2.5AH
-VR1
230V
12V
T1A
-T1
-F02
-F03
T2.5AH
-P1
-P2
-P3
/1.8A :(X1:L)
/1.8A :(X3:4b)
/1.8B :(FA1:2)
/1.8B :(SF1:P2)
/1.8B :(SF1:4)
:(SF1:1)
/3.5C
:(230V)
/3.2A
:(N)
/3.2A

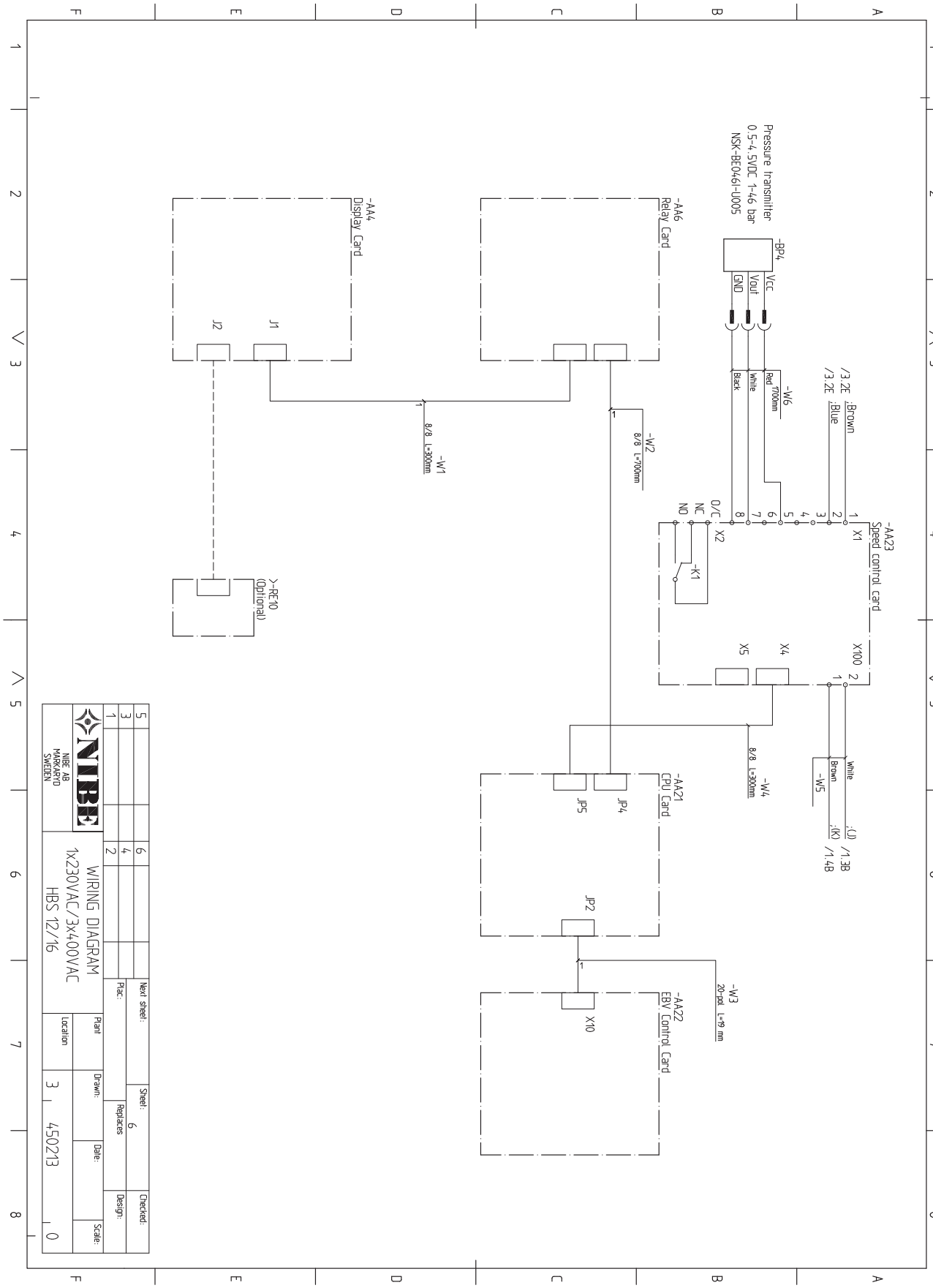
## Electrical circuit diagram



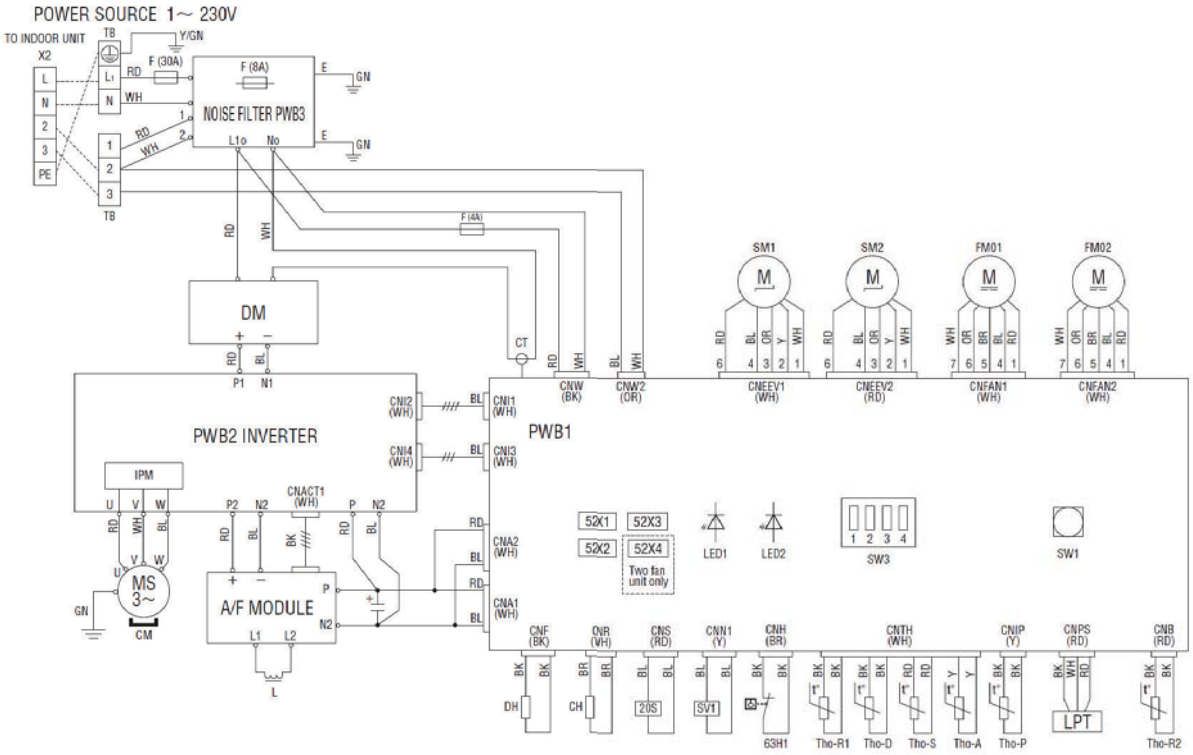

-AA6
Relay board
/3.8A :(230V)
/3.8A :(N)
/1.8B :(X1:26)
/1.4B :(X3:3)
/1.8B :(X4:11)
-FD1-QA41
-QA2
-QA1
-QA3
-K8
-K9
-K10
-K11
-K12
-K13
-K14
-AA7
-X1/1g
-X1/1f
J8
-EP22
Cooling/Heating (Optional)
-EP21
Heating System 2 (Optional)
-QN12
-X6
-GP20
-QN25
-PE2
Cooling/Heating
Circulationpump 2
Shuntvalve 2
White
Brown
Blue
/3.3D
/3.4D
/3.7C ;(H)
/1.3B ;(C)
/1.6B ;(D)
Temp. limiter
Immersion heater 2
Immersion heater 1
Immersion heater 3
NIBE AB
MARKARYD
SWEDEN
WIRING DIAGRAM
1x230VAC/3x400VAC
HBS 12/16
Location
Plant
Drawn:
Date:
Design:
Checked:
Scale:
Sheet:
Next sheet:
Replaces
450213

## Electrical circuit diagram




Pressure transmitter
0.5-4.5VDC 1-46 bar
NSK-BE046-U005
-BP4
Vcc
Vout
GND
-W6
1700mm
Red
White
Black
/3.2E
/3.2E
Brown
Blue
-AA23
Speed control card
X1
X2
X100
X4
X5
D/C
NC
NO
-K1
-W2
8/8 L=700mm
-W1
8/8 L=300mm
-AA6
Relay Card
-AA4
Display Card
J1
J2
>-RE10
(Optional)
-W4
8/8 L=300mm
-W5
White
Brown
/1.3B
/1.4B
-AA21
CPU Card
JP4
JP5
JP2
-W3
20-pol L=19 mm
-AA22
EBV Control Card
X10
NIBE AB
MARKARYD
SWEDEN
WIRING DIAGRAM
1x230VAC/3x400VAC
HBS 12/16
Next sheet:
Plan:
Plant
Location
Drawn:
Date:
Sheet:
6
Replaces
Design:
Checked:
Scale:
3
450213
0

## AMS 10-16

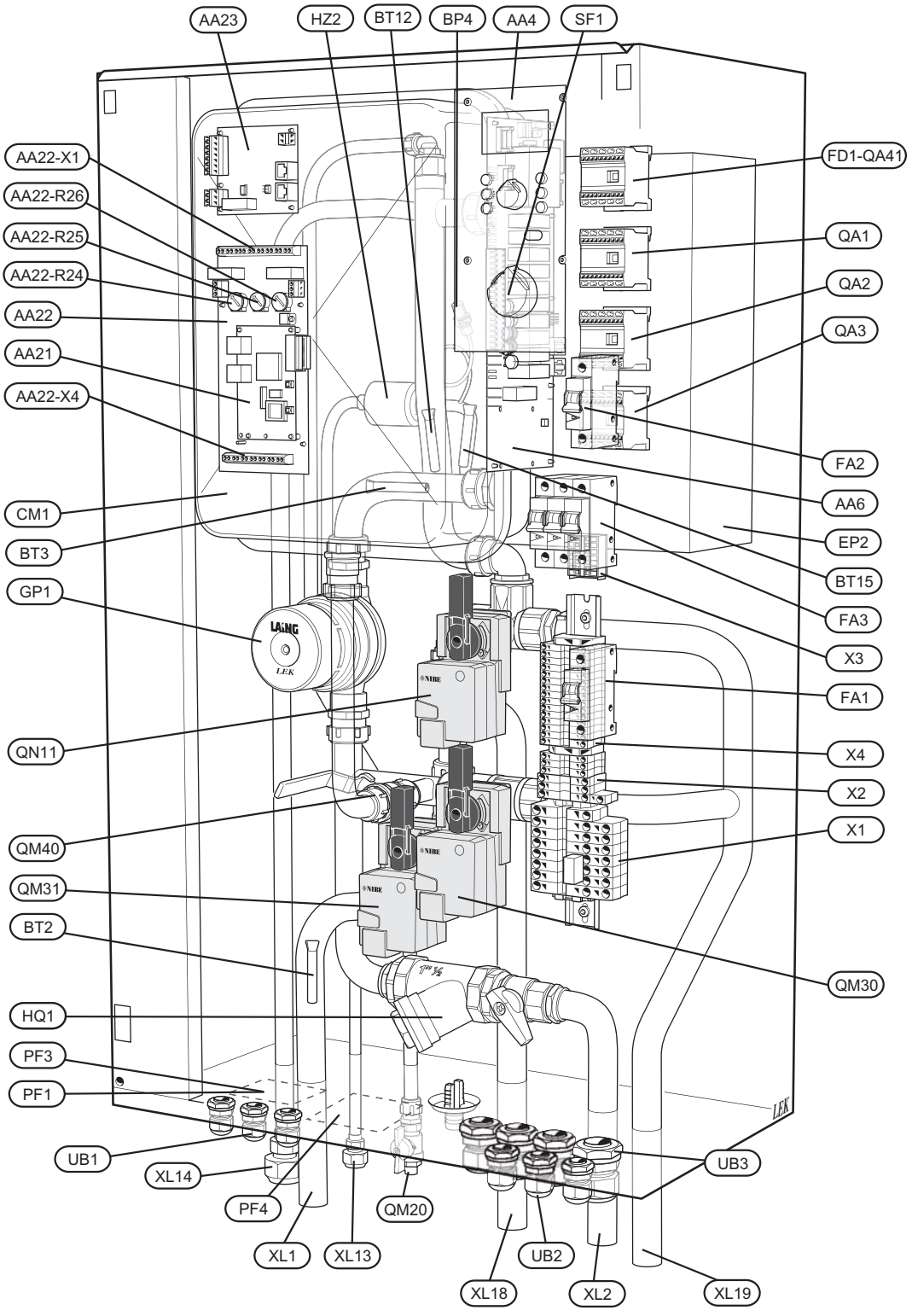

POWER SOURCE 1~ 230V
TO INDOOR UNIT
X2
TB
Y/GN
F (30A)
F (8A)
NOISE FILTER PWB3
GN
DM
CT
F (4A)
SM1
SM2
FM01
FM02
PWB2 INVERTER
PWB1
IPM
CNACT1 (WH)
MS 3~
CM
A/F MODULE
52X1
52X2
52X3
52X4
Two fan unit only
LED1
LED2
SW3
SW1
CNF (BK)
CNR (WH)
CNS (RD)
CNN1 (Y)
CNH (BR)
CNTH (WH)
CNIP (Y)
CNPS (RD)
CNB (RD)
CNW (BK)
CNW2 (OR)
CNEEV1 (WH)
CNEEV2 (RD)
CNFAN1 (WH)
CNFAN2 (WH)
CNI1 (WH)
CNI2 (WH)
CNI3 (WH)
CNI4 (WH)
CNA1 (WH)
CNA2 (WH)
DH
CH
20S
SV1
63H1
Tho-R1
Tho-D
Tho-S
Tho-A
Tho-P
LPT
Tho-R2

| Designation | Description |
|---|---|
| 20S | Solenoid for 4-way valve |
| 52X1 | Auxiliary relay (for CH) |
| 52X2 | Auxiliary relay (for DH) |
| 52X3 | Auxiliary relay (for 20S) |
| 52X4 | Auxiliary relay (for SV1) |
| 63H1 | High pressure pressostat |
| CH | Compressor heater |
| CM | Compressor motor |
| CnA~Z | Terminal block |
| CT | Current sensor |
| DH | Drain pan heater |
| DM | Diode module |
| F | Fuse |
| FM01,2 | Fan motor |
| IPM | Intelligent power module |
| L | Induction coil |
| LED1 | Indication lamp (red) |
| LED2 | Indication lamp (green) |
| LPT | Low pressure transmitter |
| SM1 | Expansion valve for cooling |
| SM2 | Expansion valve for heating |
| SW1 | Pumpdown |
| SW3 | Local settings |
| TB | Terminal block |
| Tho-A | Temperature sensor, outdoor air |
| Tho-D | Temperature sensor, hot gas |
| Tho-R1 | Temperature sensor, heat exchanger out |
| Tho-R2 | Temperature sensor, heat exchanger, in |
| Tho-S | Temperature sensor, suction gas |
| Tho-P | Temperature sensor, IPM |

# Component positions

## HBS 16

### Component image



## Component list

### Pipe connections

| | |
|---|---|
| XL1 | Climate system supply |
| XL2 | Climate system return |
| XL13 | Liquid line refrigerant |
| XL14 | Gas line refrigerant |
| XL18 | Connection, Circulation |
| XL19 | Connection, Circulation |

### Valves etc.

| | |
|---|---|
| EP2 | Heat exchanger |
| GP1 | Circulation pump, climate system |
| HQ1 | Particle filter |
| HZ2 | Drying filter |
| QM20 | Venting valve |
| QM30 | Actuator, reversing valve, hot water |
| QM31 | Actuator shuttle valve, climate system |
| QM40 | Valve, shut-off |
| QN11 | Actuator, mixing valve |

### Electrical components

| | |
|---|---|
| X1 | Terminal block, incoming mains supply |
| X2 | Terminal block, outgoing supply and communication |
| X3 | Terminal block, external addition |
| X4 | Terminal block, external immersion heater and temperature limiter/thermostat emergency mode FD1-BT30 |
| SF1 | Switch |
| FA1 | Miniature circuit breaker, control system |
| FA2 | Miniature circuit breaker, outdoor unit |
| FA3 | Miniature circuit breaker, external immersion heater |
| AA4 | Display unit |
| AA6 | Relay card |
| AA21 | CPU card |
| AA22 | EBV card |
| | R24 Setting, fuse size |
| | R25 Setting, max power, electrical addition |
| | R26 Setting, max boiler temperature |
| | X1 Terminal block |
| | X4 Terminal block |
| AA23 | Communication board |
| QA1 | Contactor |
| QA2 | Contactor |
| QA3 | Contactor |

### Sensor, thermostats

| | |
|---|---|
| BP4 | Pressure sensor, high pressure |
| BT1 | Temperature sensor, outdoor |
| BT2 | Temperature sensor, heating medium, flow |
| BT3 | Temperature sensor, heating medium, return |
| BT12 | Temperature sensor, condenser, supply |
| BT15 | Temperature sensor, fluid pipe |
| FD1-QA41 | Contactor, temperature limiter |

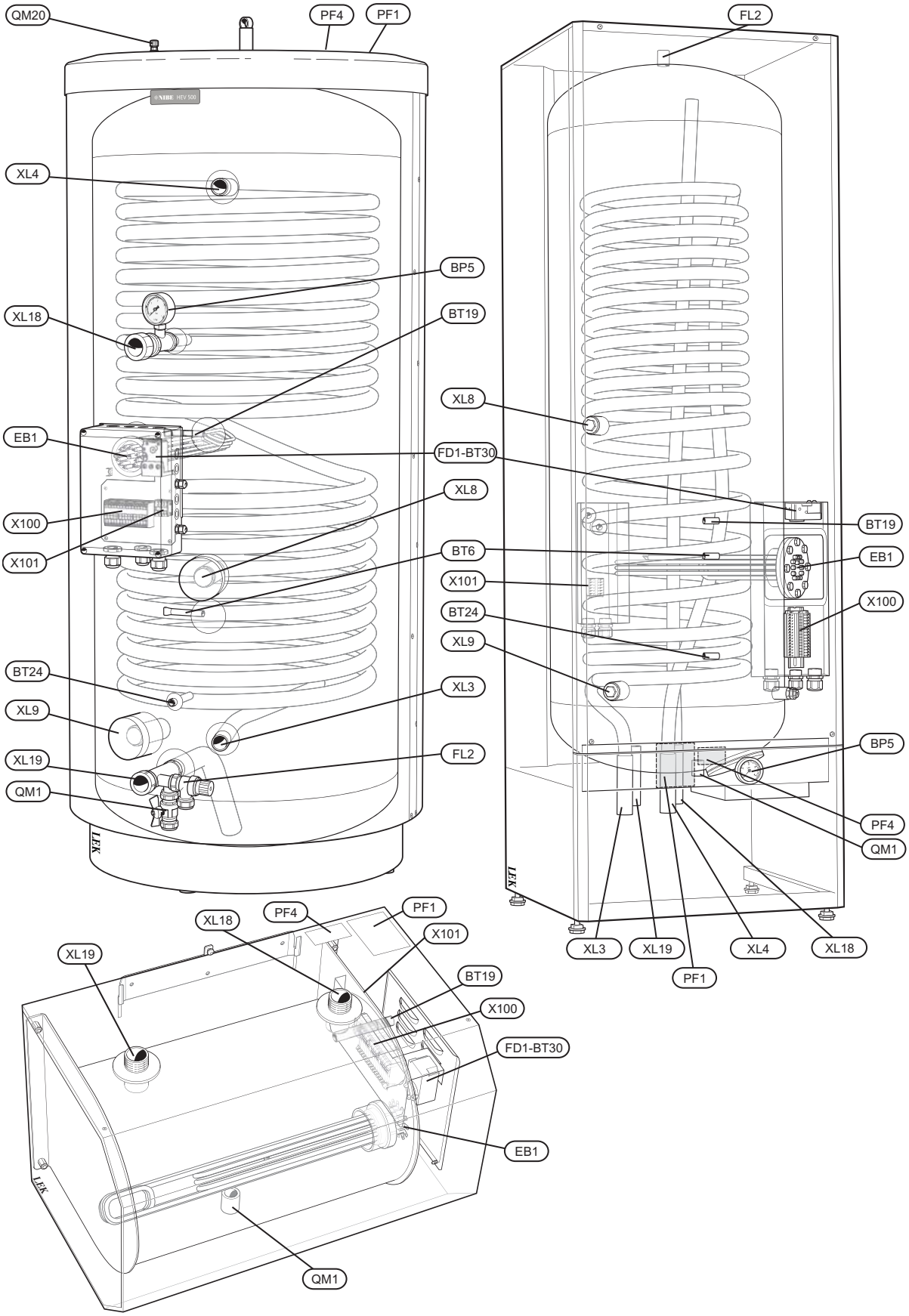
### Miscellaneous

| | |
|---|---|
| UB1 | Cable gland |
| UB2 | Cable gland |
| UB3 | Cable gland |
| PF1 | Rating plate |
| PF3 | Serial number plate |
| PF4 | Sign, pipe connections |

Component location according to IEC 62400.

## HE 30, HEV 300, HEV 500

### Component image



## List of components

### Pipe connections

| | |
|---|---|
| XL3 | Connection, Cold water |
| XL4 | Connection, Hot water |
| XL8 | Connection, Docking, in heating medium |
| XL9 | Connection, Docking, out heating medium |
| XL18 | Connection, Circulation |
| XL19 | Connection, Circulation |

### Valves etc.

| | |
|---|---|
| FL2 | Safety valve, heating medium |
| QM1 | Drain valve, heating medium |
| QM20 | Venting valve |

### Electrical components

| | |
|---|---|
| EB1 | Immersion heater |
| X100 | Terminal block |
| X101 | Terminal block |

### Sensor, thermostats

| | |
|---|---|
| BP5 | Pressure gauge |
| BT6 | Temperature sensor, hot water charging |
| BT19 | Temperature sensor, immersion heater |
| BT24 | Temperature sensor, docking |
| FD1-BT30 | Temperature limiter /Emergency mode thermostat |

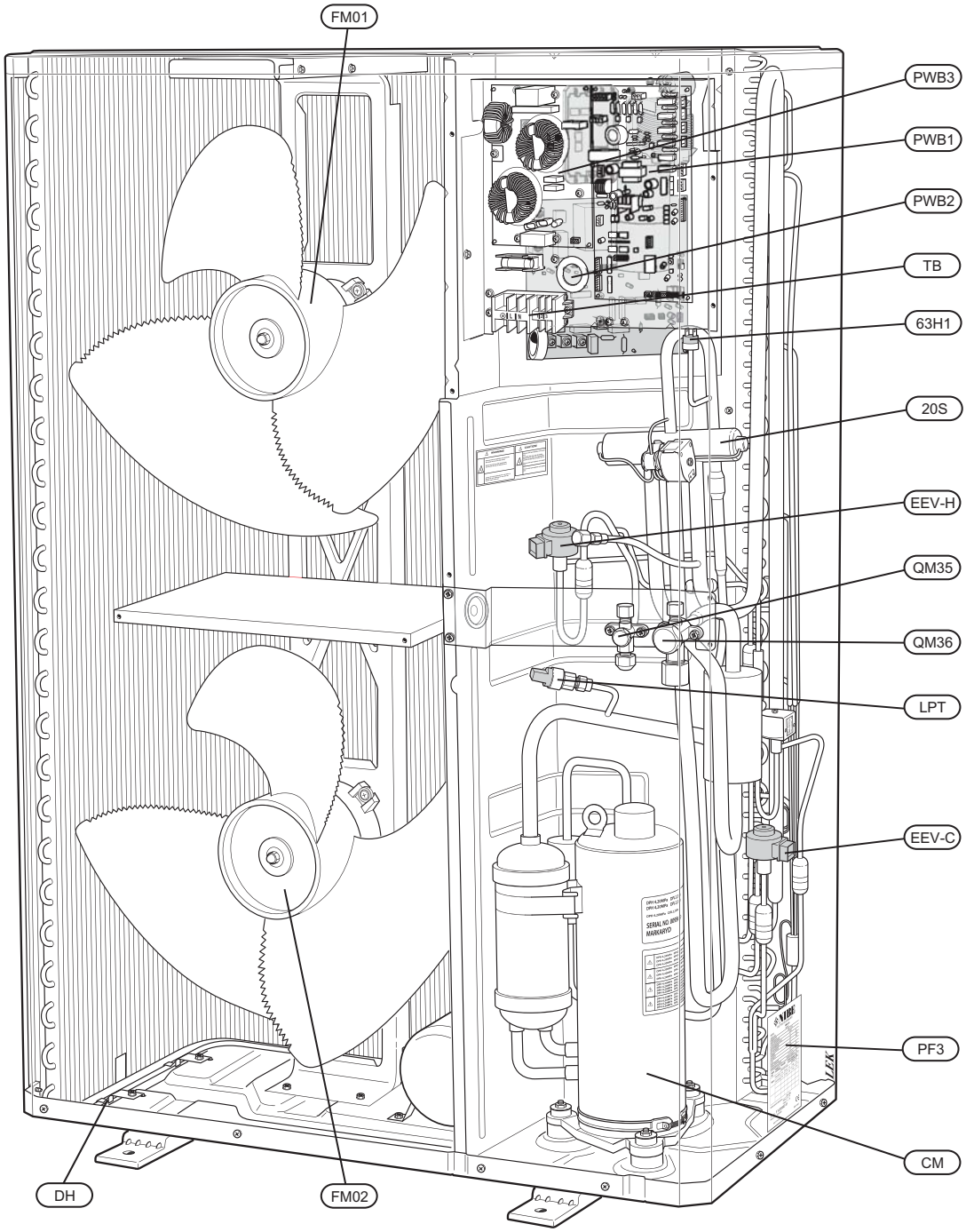
### Miscellaneous

| | |
|---|---|
| PF1 | Rating plate |
| PF4 | Sign, pipe connections |

Component location according to IEC 62400.

## Outdoor unit

### Component image, AMS 10-16



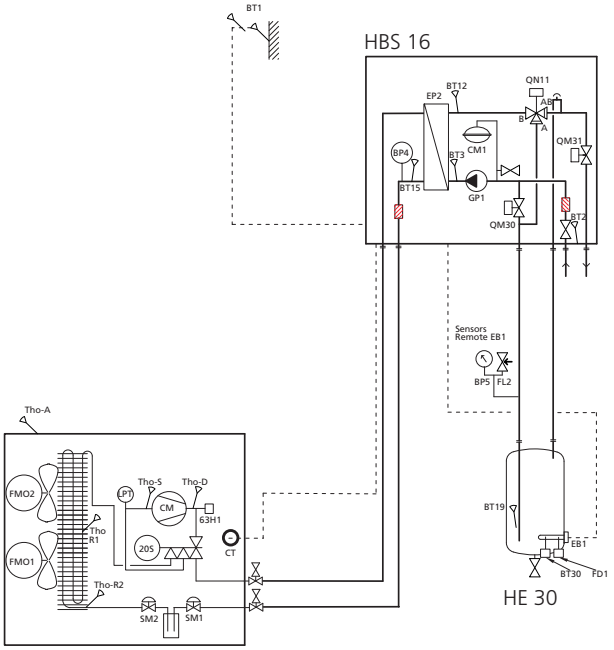
**List of components**

| | |
|---|---|
| 63H1 | High pressure pressostat |
| LPT | Low pressure transmitter |
| FM01 | Fan |
| FM02 | Fan |
| 20S | 4-way valve |
| CM | Compressor |
| PWB1 | Control board |
| PWB2 | Inverter board |
| PWB3 | Filter board |
| QM35 | Service valve, liquid side |
| QM36 | Service valve, gas side |
| EEV-H | Expansion valve, heating |
| EEV-C | Expansion valve, cooling |
| TB | Terminal block, incoming supply and communication |
| PF3 | Serial number plate |
| DH | Drain pan heater |

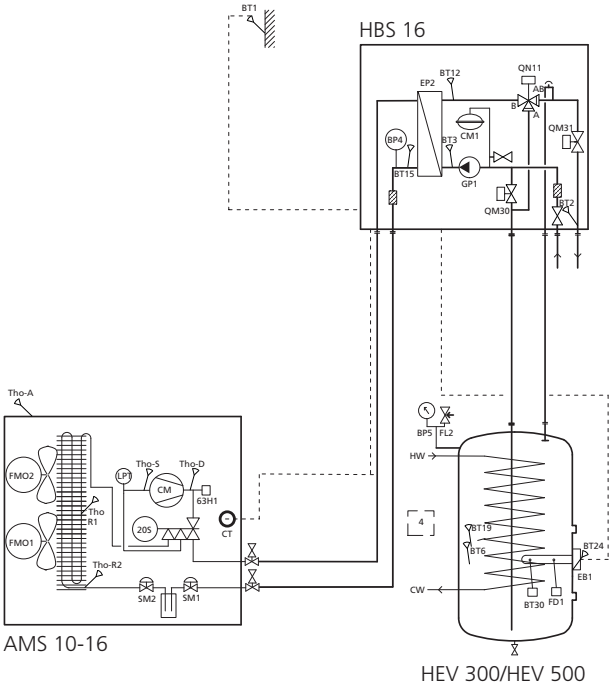
Component location according to IEC 62400.

# Temperature sensor

## Sensor placement




AMS 10-16



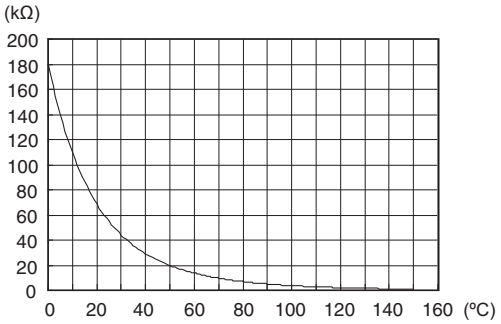

AMS 10-16

HEV 300/HEV 500

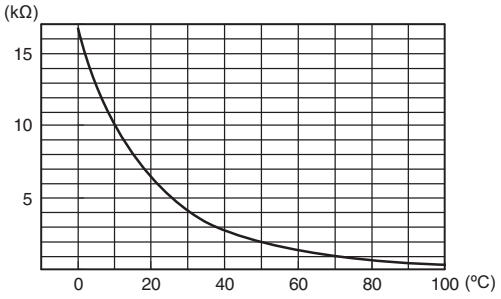
| | |
|---|---|
| BT1 | Temperature sensor, outdoor (external) |
| BT2 | Temperature sensor, flow pipe |
| BT3 | Temperature sensor, return |
| BT6 | Temperature sensor, hot water |
| BT12 | Temperature sensor, condenser out |
| BT15 | Temperature sensor, fluid pipe |
| BT19 | Temperature sensor, immersion heater |
| Tho-A | Temperature sensor, outdoor air |
| Tho-D | Temperature sensor, hot gas |
| Tho-R1 | Temperature sensor, heat exchanger out |
| Tho-R2 | Temperature sensor, heat exchanger, in |
| Tho-S | Temperature sensor, suction gas |

## Data for sensor in AMS 10-16

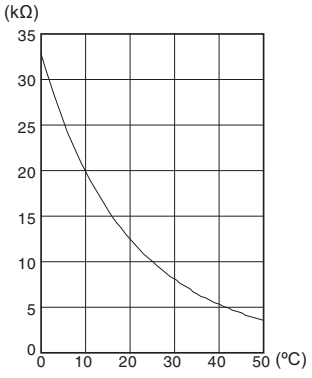
### Tho-D




### Tho-S, Tho-R1, Tho-R2




### Tho-A

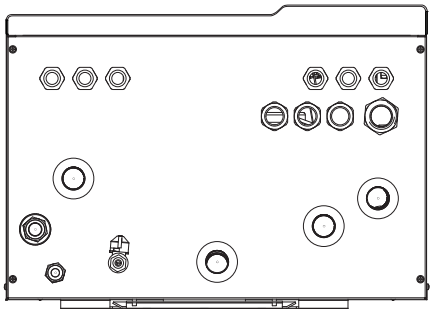


## Data for sensor in HBS 16

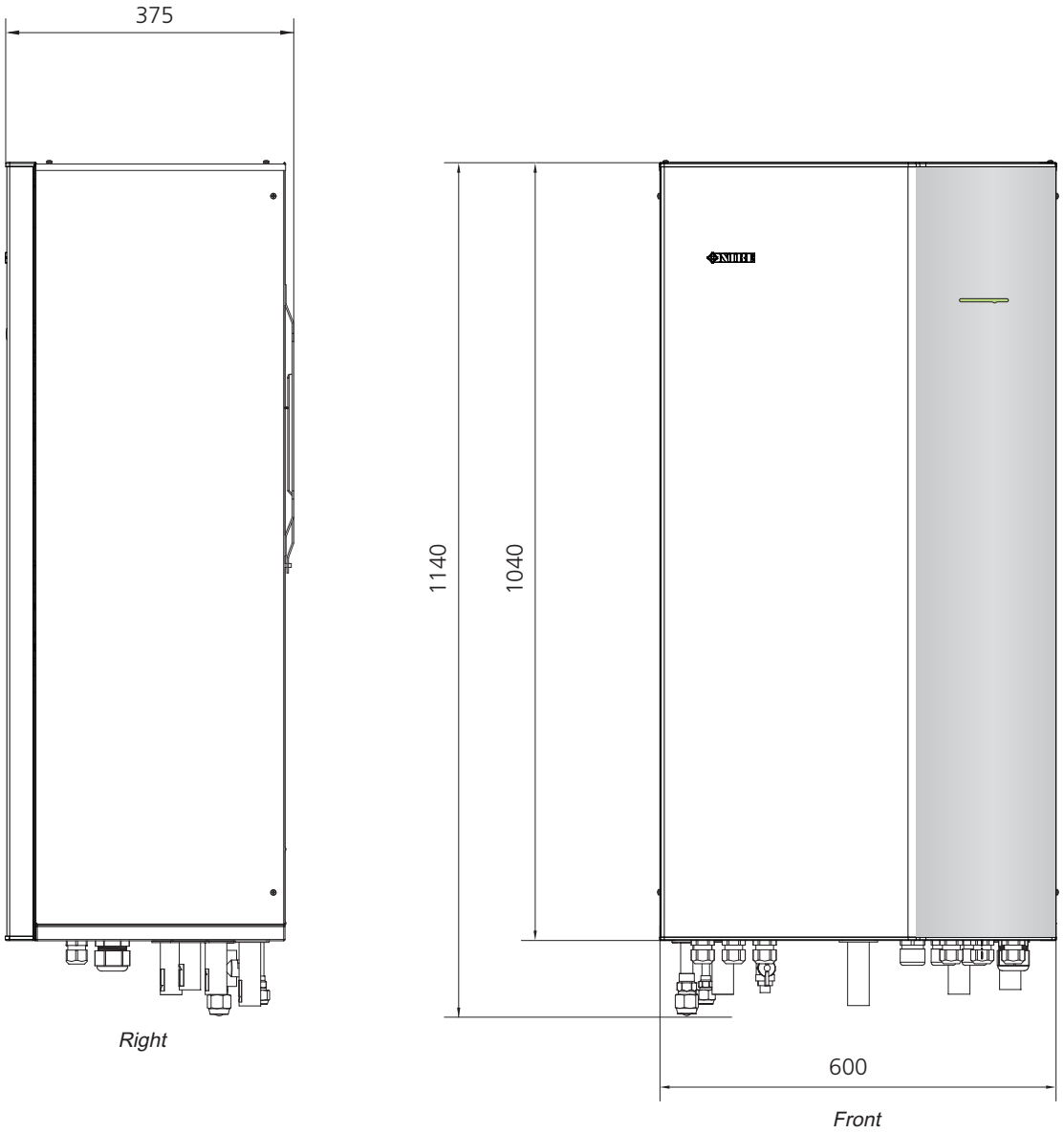
| Temperature (°C) | Resistance (k Ω) | Voltage (V) |
|---|---|---|
| -40 | 102.35 | 4.78 |
| -35 | 73.51 | 4.70 |
| -30 | 53.44 | 4.60 |
| -25 | 39.29 | 4.47 |
| -20 | 29.20 | 4.31 |
| -15 | 21.93 | 4.12 |
| -10 | 16.62 | 3.90 |
| -5 | 12.71 | 3.65 |
| 0 | 9.81 | 3.38 |
| 5 | 7.62 | 3.09 |
| 10 | 5.97 | 2.80 |
| 15 | 4.71 | 2.50 |
| 20 | 3.75 | 2.22 |
| 25 | 3.00 | 1.95 |
| 30 | 2.42 | 1.70 |
| 35 | 1.96 | 1.47 |
| 40 | 1.60 | 1.27 |
| 45 | 1.31 | 1.09 |
| 50 | 1.08 | 0.94 |
| 60 | 0.746 | 0.70 |
| 70 | 0.525 | 0.51 |

# Dimensions

## Indoor unit HBS 16



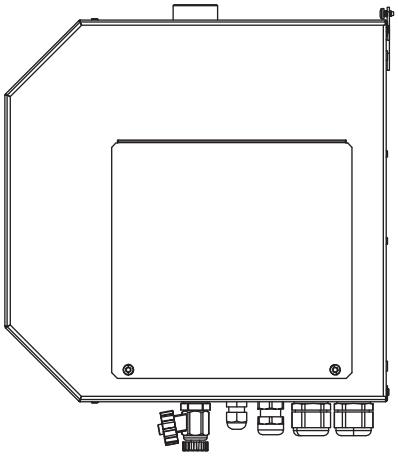
*Under*



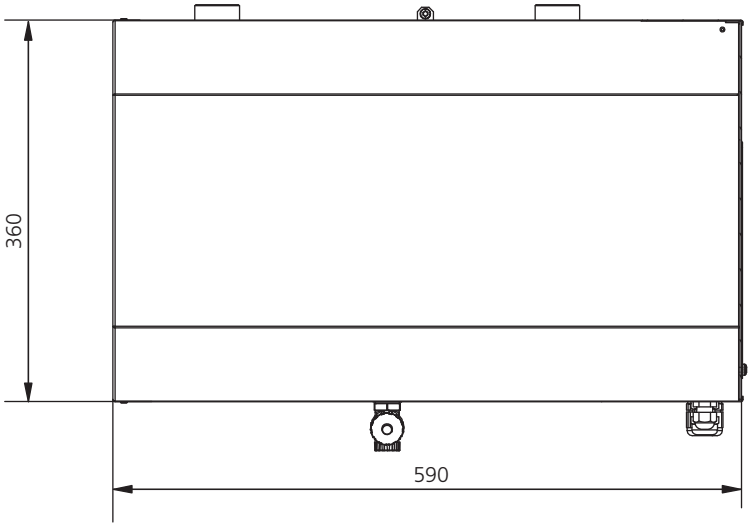

*Right*

*Front*

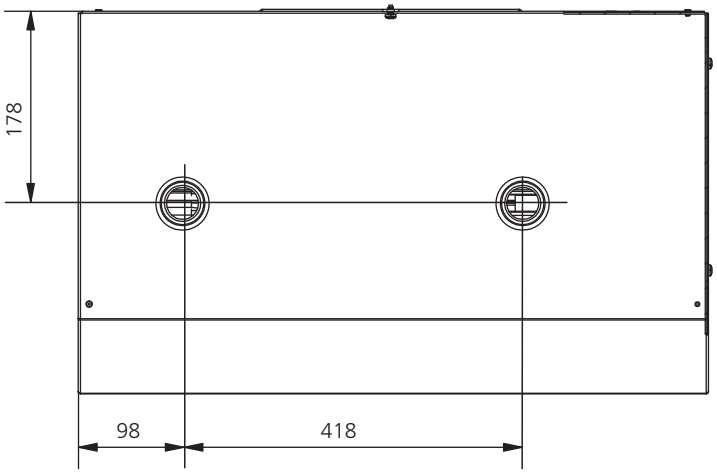
### Hot water tank HE 30



*Right*

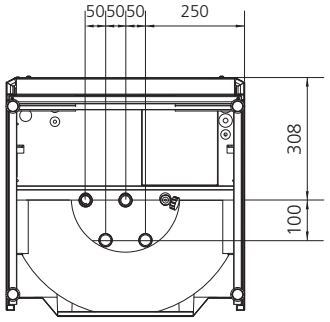



*Front*

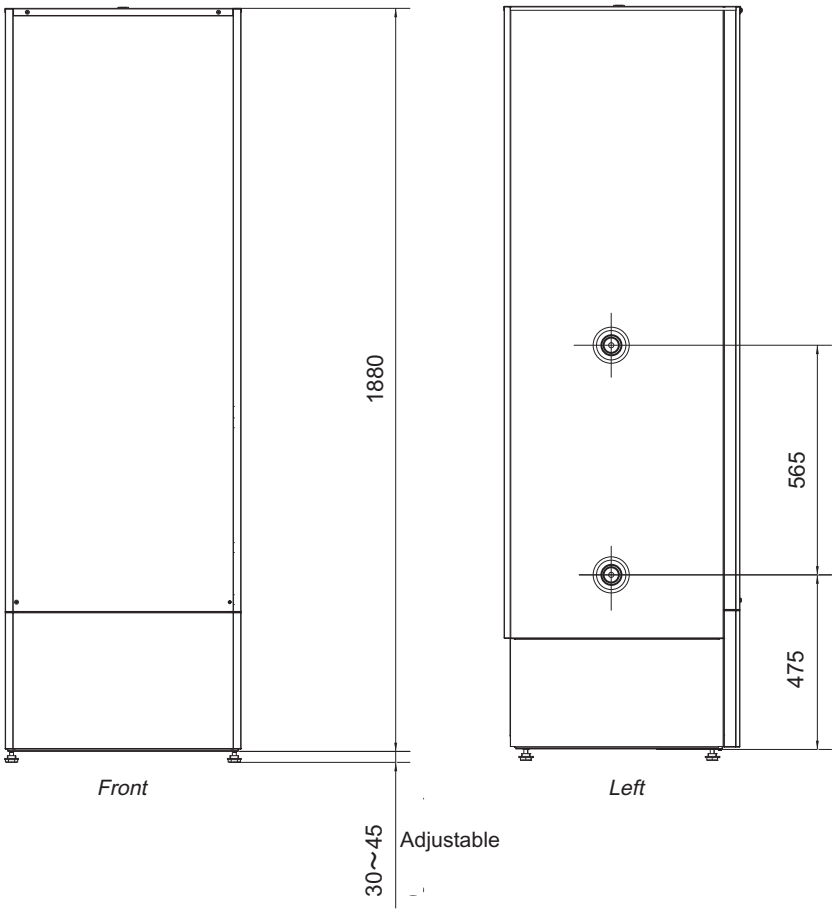



*Above*

### Water heater HEV 300

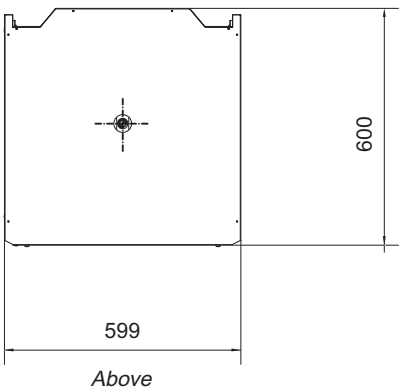



*Under*



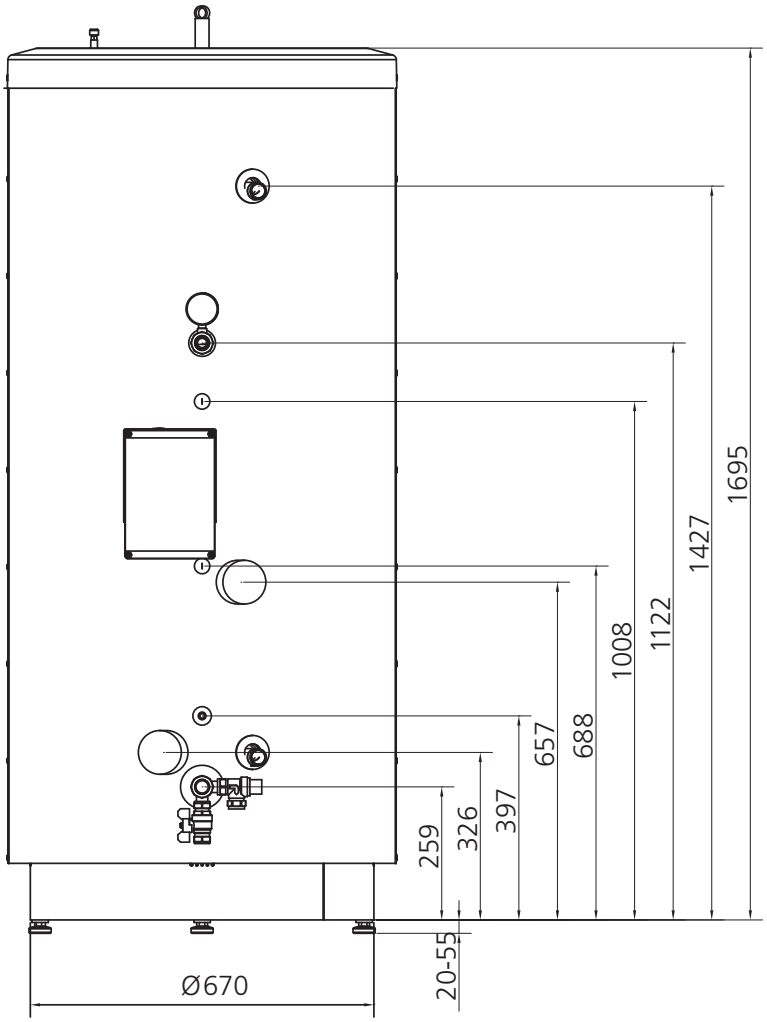

*Front*

*Left*

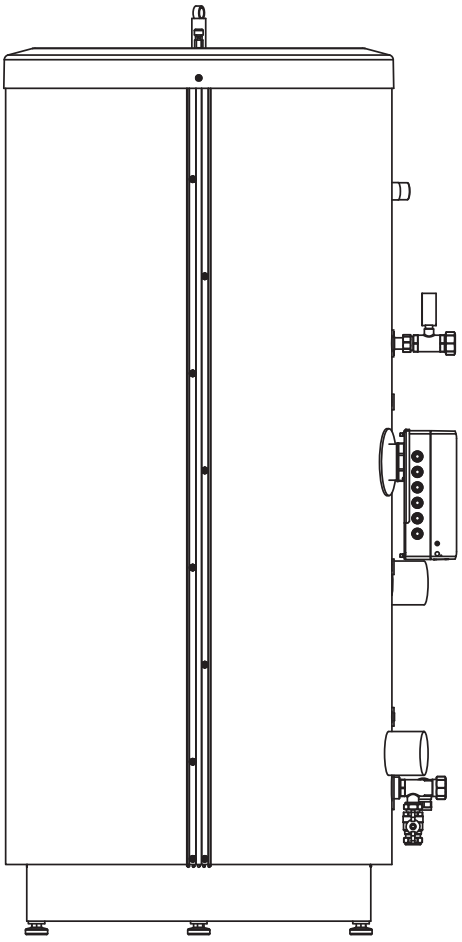



*Above*

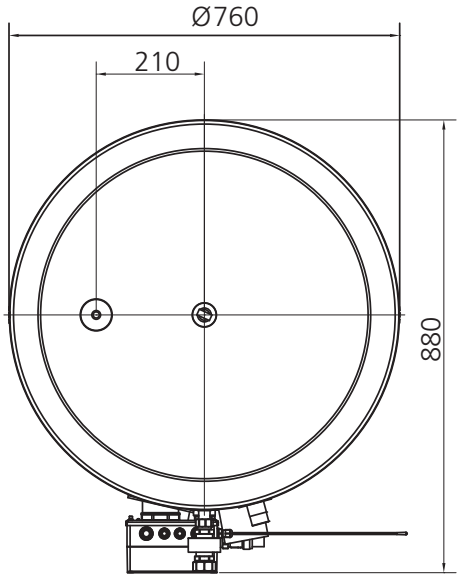
**Water heater HEV 500**




*Front*



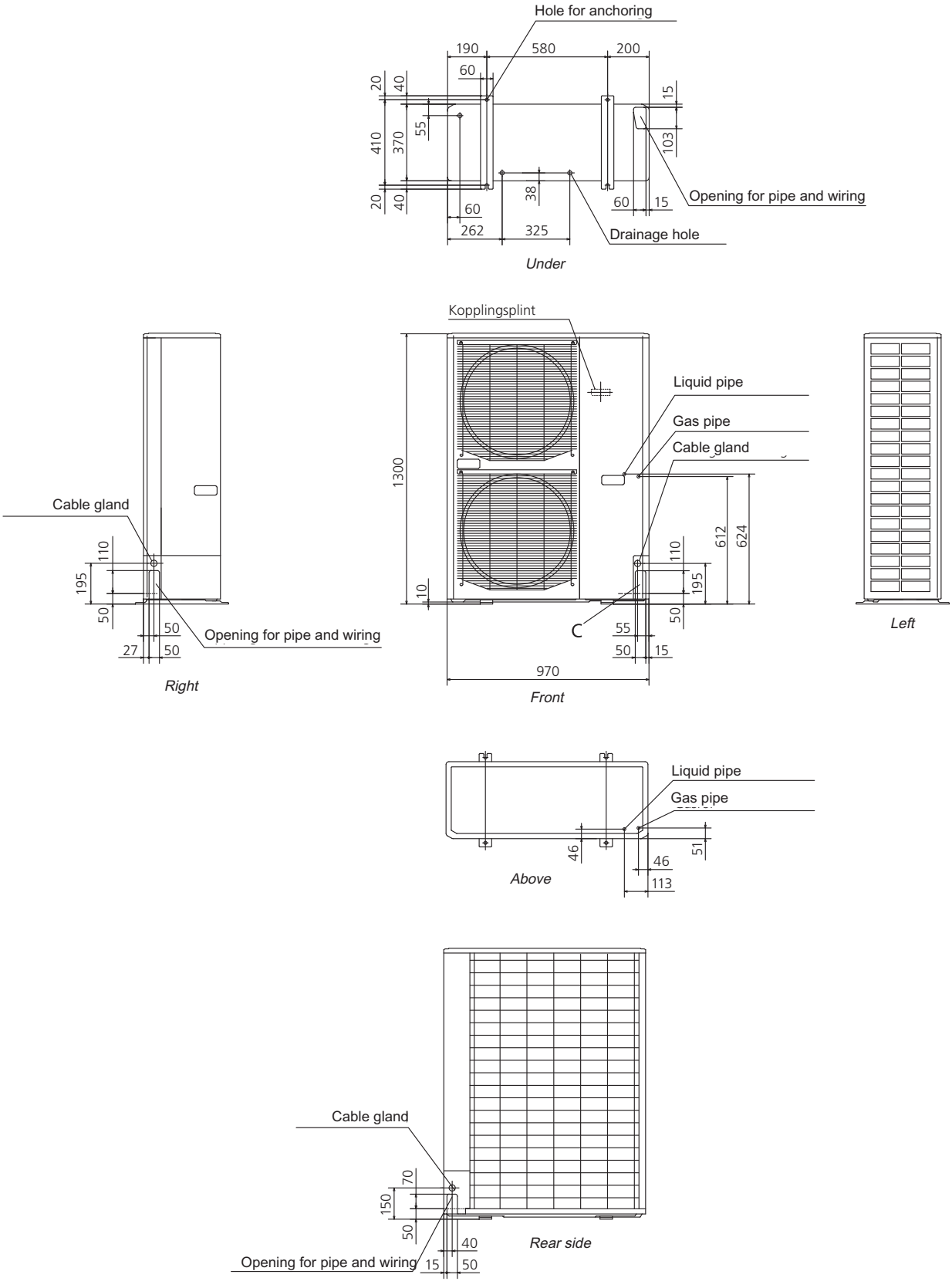
*Left*




*Above*

## Outdoor unit

### AMS 10-16



# Technical specifications

| NIBE SPLIT | 1 x 230 V | 3 x 400 V |
|---|---|---|
| Working range during heating with compressor (ambient temperature) | -20 – +43 °C | |
| Working range during cooling (ambient temperature) | +15 – +43 °C | |
| Max temperature flow line | 65 °C | |
| Max temperature flow line, only compressor | 58 °C | |
| Max temperature return line | 65 °C | |
| Min temperature flow line during heating with compressor and continuous operation | 25 °C | |
| Min temperature flow line during cooling | 18 °C | |
| Maximum temperature supply during cooling and continuous operation | 25 °C | |
| Max. current | 50 A | 25 A |
| Recommended fuse rating | 50 A | 25 A |
| Starting current | 5 A | |
| Incoming supply, deviation | -15 – +10 % | |
| The water quality, domestic hot water and climate system | ≤ EU directive no. 98/83/EF | |

| Indoor module | HBS 16 |
|---|---|
| Circulation pump, output | 9–110 W (variable speed) |
| Circulation pump, max available pressure | 60 kPa (external) |
| Circulation pump, max flow | 0.83 l/s |
| Circulation pump, flow at 20 kPa external pressure drop | 0.72 l/s |
| Min/max system flow, heating operation | 0.25 /0.79 l/s |
| Min/max system flow, cooling operation | 0.32 /0.79 l/s |
| Min flow, climate system, at 100% circulation pump speed (defrost flow) | 0.39 l/s |
| Enclosure class | IP 21 |
| Volume, total | 4 l ±5 % |
| Max pressure, climate system | 0.25 MPa (2.5 bar) |
| Expansion vessel | 18 l |
| Max pressure, cooling system | 4.5 MPa |
| Water quality, climate system | ≤ EU directive no. 98/83/EF |
| Max operating temperature | 65 °C |
| Ambient temperature | 5–35 °C, max relative humidity95 % |
| Connection, tank | Compression ring 28 mm |
| Height, without pipe/with pipe | 1040/1140 mm |
| Width | 600 mm |
| Depth | 375 mm |
| Weight | 68.5 kg |
| Electrical connections | 230 V 1AC 50 Hz or 400 V 3NAC 50 Hz |
| Part no. | 069 033/069 035 |

## Technical specifications

| Tank | HE 30 | HEV 300 | HEV 500 |
|---|---|---|---|
| Immersion heater Max 9 kW | 9 kW | | |
| Possible electrical step 4 (2, 4, 6, 9 kW) | 4 (2, 4, 6, 9 kW) | | |
| Emergency mode thermostat | 35–45 °C (factory setting 35 °C) | | |
| Temperature limiter | 98 (-8) °C | | |
| Safety valve, climate system | 0.25 MPa (2.5 bar) | | |
| Enclosure class | IP 21 | | |
| Volume, total | 30 l | 300 l | 500 l |
| Volume, hot water coil | - | 14 l | 21 l |
| Material, hot water coil | - | Stainless steel (AISI316L/AISI316 DIN 1.4404/1.4401) | |
| Max pressure, vessel | 0.25 MPa (2.5 bar) | | |
| Max pressure, hot water coil | | 1.0 MPa (10 bar) | |
| The water quality, domestic hot water and climate system | ≤ EU directive no. 98/83/EF | | |
| Max operating temperature, tank | 65 °C | | |
| Ambient temperature, tank | 5–35 °C, max relative humidity95 % | | |
| Idle loss according to EN255-3 | - | 82 W | 143 W |
| Connection, domestic water | - | 1″ ext. thread | |
| Connection, docking | - | 1″ int. thread | |
| Connection HBS | 1″ ext. thread | | 28 mm compression fitting |
| Height | 385 mm | 1900+(20-45) mm | 1740+(20-55) mm |
| Required ceiling height | - | 2080 mm | 1900 mm |
| Width | 596 mm | 600 mm | 760 mm |
| Depth | 365 mm | 600 mm | 876 mm |
| Weight | 24 kg | 95 kg | 130 kg |
| Electrical connections | 230 V 1AC 50 Hz or 400 V 3NAC 50 Hz | | |
| Part no. | 069 105 | 069 106 | 069 107 |

| Outdoor module | AMS 10-16 |
|---|---|
| Compressor | Twin Rotary |
| Speed, heating operation | 20–85 Hz (rps) |
| Speed, cooling operation | 20–77 Hz (rps) |
| Max fan flow (heating, nominal) | 6000 $m^3/h$ |
| Fan rating | 2 x 86 W |
| Defrosting | Reversing |
| Drain pan heater | 120 W |
| Breaking value high pressure | 4.15 MPa (41.5 bar) |
| Cut-out value low pressure (15 s) | 0.079 MPa (0.79 bar) |
| Height | 1300 mm |
| Width | 970 mm |
| Depth | 370 mm (+ 80 mm with foot rail) |
| Weight | 105 kg |
| Colour (two coats powder coating) | Dark gray |
| Power and communication connection from indoor module | 3-conductor 6 $mm^2$ + 3-conductor 1.5 $mm^2$ |
| Refrigerant quantity (R410A) | 4.0 kg |
| Max. length, refrigerant pipe, one way | 30 m* |
| Max height difference, refrigerant pipe | 7 m |
| Pipe connection option | Bottom / right-hand side / rear side |

| Outdoor module | AMS 10-16 |
|---|---|
| Dimensions, refrigerant pipe | Gas pipe: OD15.88 (5/8")<br>Liquid pipe: OD9.52 (3/8") |
| Pipe connections | Flare |
| Part no. | 064 035 |

*If the length of the refrigerant pipes exceeds 15 m extra refrigerant must be filled at 0.06 kg/m.

## Performance, HBS 16 and AMS 10-16

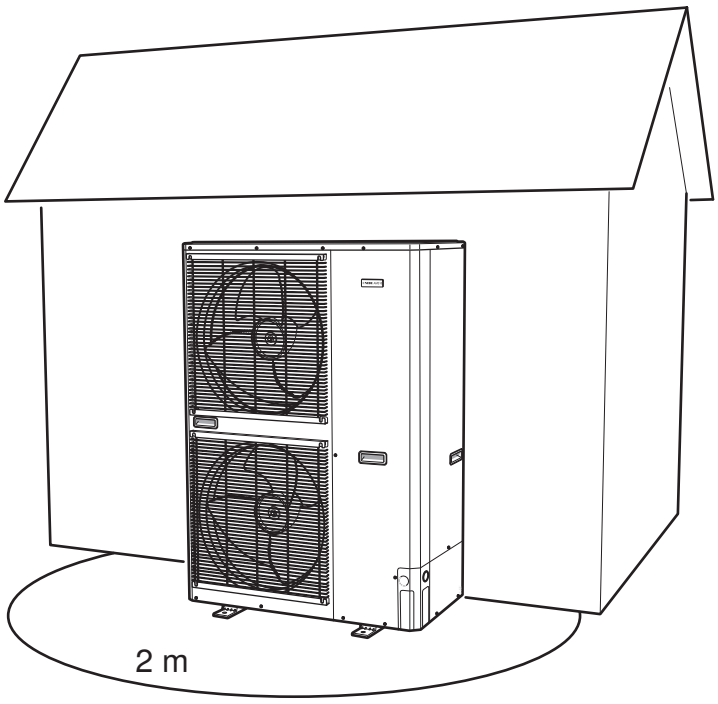
| Heating | Outd. temp: / Supply temp. | Min | Nominal | Max |
|---|---|---|---|---|
| **EN14511** **ΔT5K** Output/input/COP | 7/35 °C (floor) | 3.66/0.95/3.86 | 12.02/2.71/4.44 | 15.82/3.89/4.07 |
| | 2/35 °C (floor) | 2.98/0.97/3.08 | 10.12/2.74/3.69 | 12.84/3.80/3.38 |
| | -7/35 °C (floor) | 2.72/1.18/2.30 | 8.08/2.69/3.01 | 10.79/3.78/2.85 |
| | -15/35 °C (floor) | 2.92/1.44/2.02 | 6.34/2.60/2.44 | 8.60/3.54/2.43 |
| | 7/45 °C | 5.09/1.51/3.38 | 11.69/3.56/3.28 | 15.20/4.64/3.28 |
| | 2/45 °C | 4.10/1.48/2.77 | 9.53/3.21/2.97 | 12.18/4.40/2.77 |
| | -7/45 °C | 3.08/1.56/1.97 | 7.49/3.11/2.41 | 10.05/4.37/2.30 |
| | -15/45 °C | 2.72/1.68/1.61 | 5.52/2.93/1.88 | 7.50/4.00/1.88 |
| | 7/55 °C | 6.55/2.38/2.76 | 10.31/3.86/2.67 | 13.29/5.28/2.52 |
| | -7/55 °C | 3.74/2.33/1.61 | 6.26/3.55/1.76 | 8.55/4.92/1.74 |

| Cooling | Outd. temp: / Supply temp. | Min | Nominal | Max |
|---|---|---|---|---|
| **EN14511** **ΔT5K** Output/input/EER | 27/18 °C | 5.80/160/4.20 | 15.0/338/4.42 | 18.5/4.26/4.35 |
| | 35/18 °C | 5.20/1.79/3.41 | 13.5/3.82/3.52 | 16.6/4.78/3.47 |

## Sound pressure levels

AMS 10 is usually placed next to a house wall, which gives a directed sound distribution that should be considered. Accordingly, you should always attempt to find a placement on the side that faces the least sound sensitive neighbouring area.

The sound pressure levels are further affected by walls, bricks, differences in ground level, etc and should therefore only be seen as guide values.

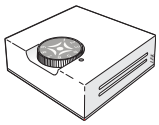



| Noise, AMS 10-16 | | Max |
|---|---|---|
| Sound power level* | $L_W$(A) | 71.5 |
| Sound pressure level at 2 m free standing* | dB(A) | 57.5 |

* Variable up to Max value.

# Accessories

## Accessories



**RG 10**

Room sensor.

Part no. 018 433



**HR 10**

Auxiliary relay

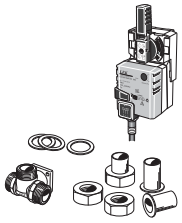
Part no. 089 423



**SRB 22**

Relay box for solar power control

Part no. 067 109



**VCC 28**

Reversing valve, cooling.

For separate cooling and heating systems.

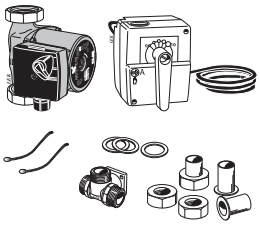
Part no. 067 165



**RE 10**

Room unit

Part no. 067 004



**ESV 22/ESV 28**

Extra mixing valve group.

Part no. 067 047/067 166



**UKV**

Buffer vessel/operating tank in steel.

UKV 40:

Heating/cooling

Part no. 088 470

UKV 100:

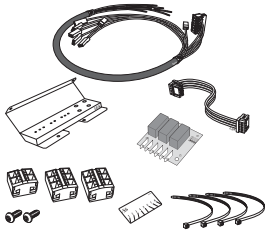
Heating

Part no. 088 207

UKV 102:

Cooling/heating

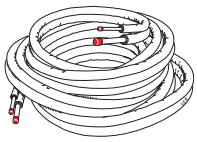
Part no. 080 310



**ACK 28**

Cable kit for ESV 28 or VCC 28.

Part no. 067 167



**Refrigerant pipe kit 12 m**

Insulated

Part no. 067 032



**EMK270**

Energy measuring HBS 16

Part no. 067 050

# Safety precautions

## Caution

**The installation must be carried out by a qualified installer.**
If you install the system yourself, serious problems may occur, for example water leaks, refrigerant leaks, electric shocks, fire and personal injury, as a result of a system malfunction.

**Install the system in full accordance with this installation manual.**
Incorrect installation can cause bursts, personal injury, water leaks, refrigerant leaks, electric shocks and fire.

**Observe the measurement values before working on the cooling system, especially when installing in small rooms, so that the limit for the refrigerant's density is not exceeded.**
Consult an expert to interpret the measurement values. If the refrigerant density exceeds the limit, lack of oxygen can occur in the event of any leak, which can cause serious accidents.

**Observe the measurement values, especially when installing in small rooms, so that the limit for the refrigerant's density is not exceeded.**
Consult an expert to interpret the measurement values. If the refrigerant density exceeds the limit, lack of oxygen can occur in the event of any leak, which can cause serious accidents.

**Use original accessories and the stated components for the installation.**
If parts other than those stated by us are used, water leaks, electric shocks, fire and personal injury may occur as the unit may not work properly.

**Ventilate the working area well – refrigerant leakage may occur during service work.**
If the refrigerant comes into contact with naked flames, poisonous gas is created.

**Ventilate the working area well – refrigerant leakage may occur during installation work.**
If the refrigerant comes into contact with naked flames, poisonous gas is created.

**Install the unit in a location with good support.**
Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury. Installation without sufficient support can also cause vibrations and noise.

**Ensure that the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.

**Ensure that no air enters the process circuit when the heat pump is installed or removed.**
If air enters the process circuit, the pressure becomes too high, which can cause bursts and personal injury.

**The electrical installation must be carried out by a qualified electrician and the system must be connected as a separate circuit.**
Power supply with insufficient capacity and incorrect function can cause electric shocks and fire.

**Use the stated cables for the electrical connection, tighten the cables securely in the terminal blocks and relieve the wiring correctly to prevent overloading the terminal blocks.**
Loose connections or cable mountings can cause abnormal heat production or fire.

**Arrange the wiring in the control box so that it cannot be pushed up further into the box by mistake. Install the service panel's cover correctly.**
Incorrect installation can result in overheating and fire.

**Check, after completed installation or service, that no refrigerant leaks from the system in gas form.**
If refrigerant gas leaks into the house and comes into contact with an aerotemp, an oven or other hot surface, poisonous gases are produced.

**Check, after completed installation, that no refrigerant leaks from the system in gas form.**
If refrigerant gas leaks into the house and comes into contact with an aerotemp, an oven or other hot surface, poisonous gases are produced.

**For R410A use the stated pipe type and cap nuts and for R410A use the stated tool.**
Using existing parts (for R22) can cause breakdowns and serious accidents due to process circuit bursts.

**Tighten the cap nut as stated using a torque wrench.**
Tighten to the correct torque. Overtightening of the cap nut can lead to breaks and refrigerant leaks.

**Connect the cooling circuit pipe and complete the pipe installation before running the compressor.**
If the compressor is run when the service valve is not open and the pipe is not connected, the system may burst causing personal injury, due to abnormally high pressure in the system.

**Switch off the compressor before disconnecting the pipe from the pump.**
If the pipe is disconnected whilst the compressor is running and the service valve is open, air is mixed into the process circuit. This causes unusually high pressure in the process circuit, which can cause bursts and personal injury.

**Only use original accessories. The installation must be carried out by a qualified installer.**
If you install the system yourself, water leaks, electric shock and fire can occur.

**Do not perform any repairs yourself. Consult the dealer if the system requires repair.**
Incorrectly performed repairs can cause water leakage, refrigerant leakage, electric shocks or fire.

**Consult the dealer or an expert regarding removal of the heat pump.**
Incorrect installation can cause water leakage, refrigerant leaks, electric shocks or fire.

**Switch off the power supply in the event of a service or inspection.**
If the power supply is not shut off, there is a risk of electric shocks and damage due to the rotating fan.

**Do not run the unit with removed panels or protection.**
Touching rotating equipment, hot surfaces or high voltage parts can cause personal injury due to entrapment, burns or electric shocks.

**Cut the power before starting electrical work.**
Failure to cut the power can cause electric shocks, damage and incorrect function of the equipment.

## Care

**Carry out the electrical installation with care.**
Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting.

**Use main switch with sufficient breaking capacity.**
If the switch does not have sufficient breaking capacity, malfunctions and fire can occur.

**Always use a fuse with the correct rating in the locations where fuses are to be used.**
Connecting the unit with copper wire or other metal thread can cause unit breakdown and fire.

**Cables must be routed so that they are not damaged by metal edges or trapped by panels.**
Incorrect installation can cause electric shocks, heat generation and fire.

**Do not install the indoor unit in close proximity to locations where leakage of combustible gases can occur.**
If leaking gases collect around the unit, fire may occur.

**Do not install the unit where corrosive gas (for example nitrous fumes) or combustible gas or steam (for example thinner and petroleum gases) can build up or collect, or where volatile combustible substances are handled.**
Corrosive gas can cause corrosion to the heat exchanger, breaks in plastic parts etc. and combustible gas or steam can cause fire.

**Do not use the indoor section where water splashes may occur, for example in laundries.**
The indoor section is not waterproof and electric shocks and fire can therefore occur.

**Do not use the indoor section for storing food, cooling precision instruments, freeze-conservation of animals, plants or art.**
This can damage the items.

**Do not install and use the system close to equipment that generates electromagnetic fields or high frequency harmonics.**
Equipment such as inverters, standby sets, medical high frequency equipment and telecommunications equipment can affect the air condi-

tioning unit and cause malfunctions and breakdowns. The air conditioning unit can also affect medical equipment and telecommunications equipment, so that it functions incorrectly or not at all.

**Do not install the outdoor unit in the locations stated below.**
- Locations where leakage of combustible gas can occur.
- Locations where carbon fibre, metal powder or other powder that can enter the air.
- Locations where substances that can affect the air conditioning unit, for example, sulphide gas, chlorine, acid or alkaline substances can occur.
- Locations with direct exposure to oil mist or steam.
- Vehicles and ships.
- Locations where machines that generate high frequency harmonics are used.
- Locations where cosmetic or special sprays are often used.
- Locations that can be subjected to direct salty atmospheres. In this case, the outdoor unit must be protected against direct intakes of salty air.
- Locations where large amounts of snow occur.
- Locations where the system is exposed to chimney smoke.

**If the bottom frame of the outdoor section is corroded, or in any other way damaged, due to long periods of operation, it must not be used.**
Using an old and damaged frame can cause the unit to fall and cause personal injury.

**If soldering near the unit, ensure that solder residue does not damage the drip tray.**
If solder residue enters the unit during soldering, small holes can appear in the tray resulting in water leakage. To prevent damage, keep the indoor unit in its packing or cover it.

**Do not allow the drainage pipe to exit into channels where poisonous gases, containing sulphides for example, can occur.**
If the pipe exits into such a channel, any poisonous gases will flow into the room and seriously affect the user's health and safety.

**Insulate the cooler unit's connection pipes so that the ambient air moisture does not condense on them.**
Insufficient insulation can cause condensation, which can lead to moisture damage on the roof, floor, furniture and valuable personal property.

**Do not install the outdoor unit in a location where insects and small animals can inhabit.**
Insects and small animals can enter the electronic parts and cause damage and fire. Instruct the user to keep the surrounding equipment clean.

**Take care when carrying the unit by hand.**
If the unit weights more than 20 kg, it must be carried by two people. Do not carry by the plastic strap, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts from the aluminium flanges.

**Dispose of any packaging material correctly.**
Any remaining packaging material can cause personal injury as it contains nails and wood.

**Do not touch any buttons with wet hands.**
This can cause electric shocks.

**Do not touch any refrigerant pipes with your hands when the system is in operation.**
During operation the pipes become extremely hot or extremely cold, depending on the method of operation. This can cause burn injuries or frost injuries.

**Do not shut off the power supply immediately after operation has start.**
Wait at least 5 minutes, otherwise there is a risk of water leakage or breakdown.

**Do not control the system with the main switch.**
This can cause fire or water leakage. In addition, the fan can start unexpectedly, which can cause personal injury.

## Especially for units intended for R410A

- Only use R410A refrigerant. R410A means that the pressure is about 1.6 times as high as conventional refrigerants.

- The service valve's filling connection and control output on the indoor unit in the system for R410A are different sizes, to prevent the system being filled with the incorrect refrigerant by mistake. The machined dimension on the refrigerant pipe's collared part as well as the cap nut's parallel side dimension has been changed to increase the system's overpressure durability.

- Therefore, installers and service technicians must ensure that only tools approved for working with R410A are used.

- Do not use charging bottles. These types of bottles change the composition of the refrigerant, which makes the performance of the system worse.

- When filling refrigerant, the refrigerant must always leave the bottle in liquid form.

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