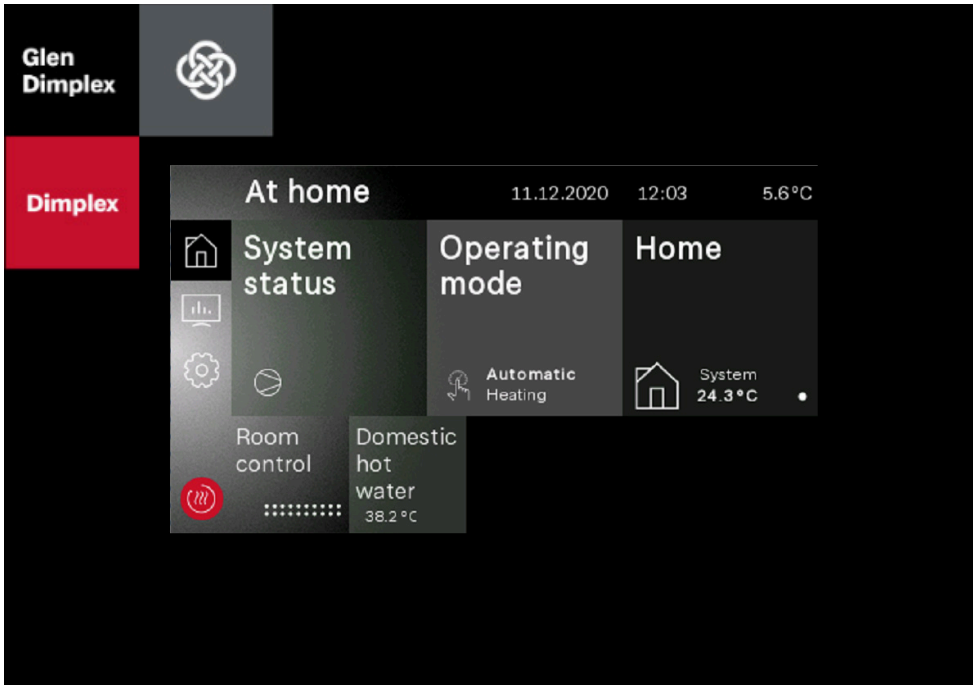
Glen Dimplex Deutschland

Dimplex

WPM Touch



Operating instructions for users and specialists

Heat pump manager

Order no.: 452117.66.02-EN

EN · FD 0101

Table of contents

1 Safety notes

1.1 Symbols and markings

NOTE

Notes contain important information and are indicated in the manual with the symbol shown above.

TIP

Tips contain information for energy efficient operation and are indicated in the manual with the symbol shown above.

1.2 General function

For installation, operation and maintenance refer to the installation and operating instructions. This unit should only be installed and repaired by a qualified technician. Repairs which are improperly carried out can endanger the safety of the user. In compliance with applicable regulations, the installation and operating instructions must always be available and should be given to the technician working on the device for his/her information. We therefore request that these installation and operating instructions be passed on to the new tenant or owner should there be a change in occupancy. Do not connect the device if it is visibly damaged. In this event, ask the supplier for advice. To prevent damage, ensure only genuine spare parts are used. All relevant environmental requirements regarding the recovery, recycling and disposal of materials and components should be observed in accordance with the applicable standards.

1.3 Regulations and safety information

- Any adjustments to the settings within the unit must only be carried out by an authorised technician.
- The heat pump manager should only be operated in dry rooms at temperatures ranging between 0 °C and 35 °C. Ensure that no condensation forms on the device.
- To ensure that the frost protection function on the heat pump works properly, the heat pump manager must remain connected to the power supply and the flow must be maintained through the heat pump at all times.

2 Operation

2.1 General

The heat pump manager is essential for the operation of air-to-water, brine-to-water and water-to-water heat pumps. It regulates a bivalent, monovalent or mono energy heat pump heating system and monitors the safety units in the refrigeration circuit. Depending on the heat pump type, the heat pump manager is either installed in the heat pump casing or is delivered with the heat pump as a wall-mounted controller. It regulates both the heating system and the heat source system.

The information below is intended only to describe operation and its constituent elements. If more detailed information about settings is required, it can be found in the Help for the menu option to be set.

2.2 Initial view

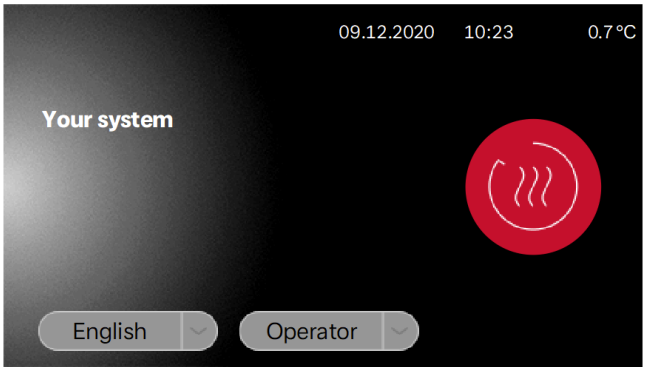


Abb. 2.1: Initial view with language and user selection

Access to the display and operating unit is obtained by selecting the relevant user group and then pressing the red login symbol.

- Operator
- Specialist
- Service

Password entry is necessary for access depending on the selected user group. (Cap. 2.4.5 on page 6)

NOTE

If language and user selection is not possible, the touch display is still in start mode.

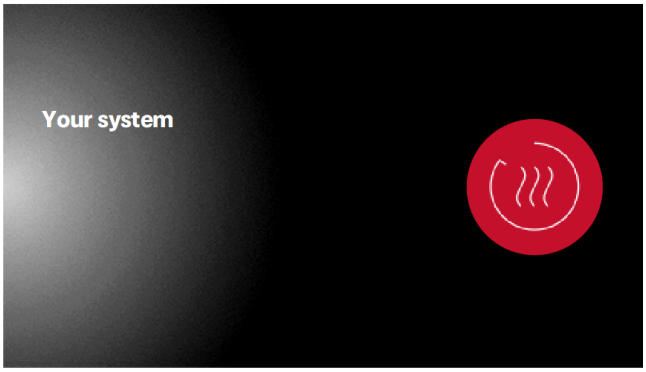


Abb. 2.2: Touch display is in start mode

2.3 Display and operating unit

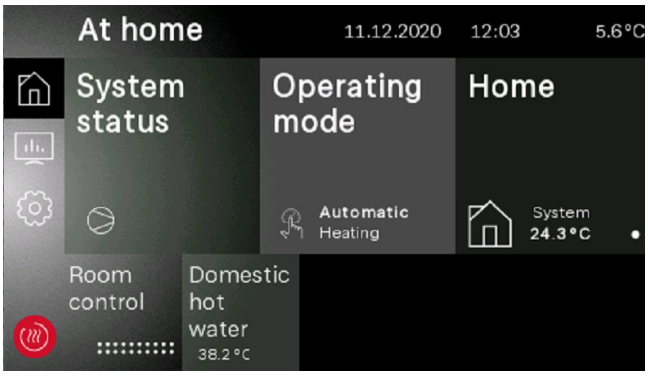


Abb. 2.3: Operator view

The display and operating unit can be used to make the settings necessary for operation and to view different displays. The settings and displays are divided into different user groups.

- Operator
- Specialist
- Service

Access to the user groups is selected using the start screen.

There are different options for changing a value depending on the user group and the set value.

2.3.1 +Hotter/-Colder buttons

The heating curve or set temperature can be adjusted in a slider view using the +Hotter/-Colder buttons. Tapping once changes the value by “1” or “0.1”. Holding down the button changes the value more quickly.

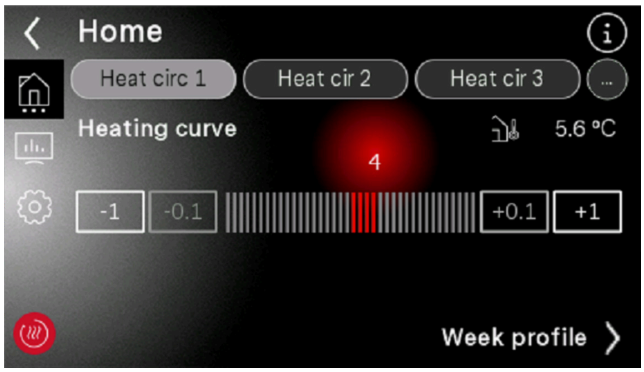


Abb. 2.4: Changing the value with a slider

2.3.2 +/- buttons

When making settings using the +/- buttons, the value is tapped to change it and is then displayed inverted.

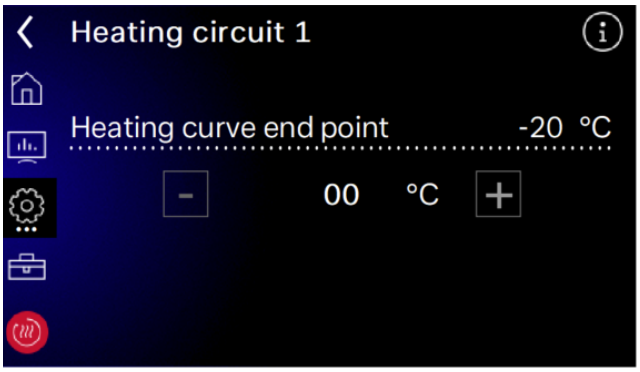


Abb. 2.5: Changing value with +/- buttons

The value is changed using the +/- buttons. Pressing the display area once adopts the value.

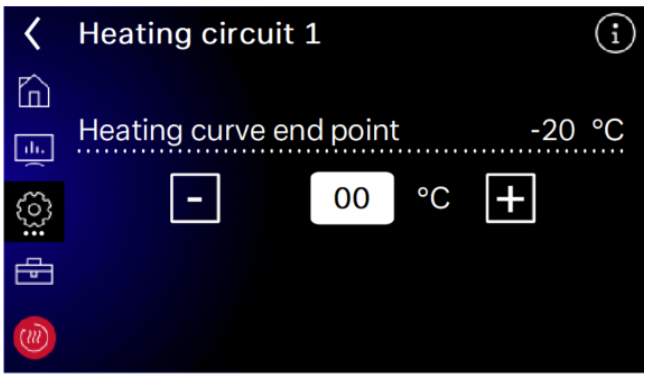


Abb. 2.6: Inverted set value

2.3.3 Keyboard

The value is changed using the screen keyboard. The value to be changed is tapped and shown inverted here. The value is then changed using the keyboard. The change is applied using the angled “Confirm” button.

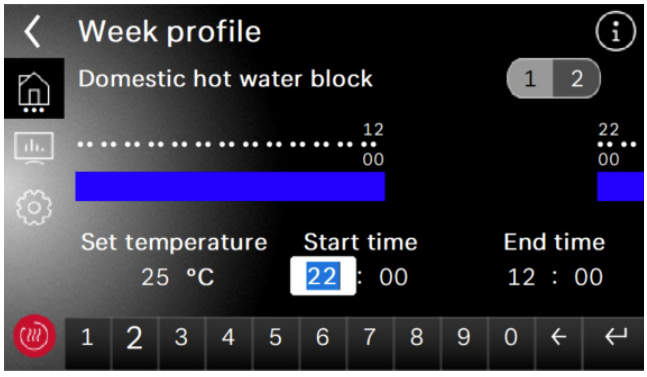


Abb. 2.7: Changing value with a keyboard

2.4 Main menu

The main menu consists of 5 operator levels. Access to the individual operator levels is enabled according to the selected user group. The red symbol takes you back to the initial screen with login.

Home:	System status, operating mode, settings for the operator
Analytics:	System data, operating data, runtimes, quantity of thermal energy, inputs and outputs
Settings:	Date and time, language and region, screen, Home app
Installation:	Initial heating programs, system setup, function locks, EasyOn
Initial view:	Login

2.4.1 Home

The “Home” menu provides a clear overview of all the necessary displays and settings for the operator. Specifically, it can be used to easily change the operating mode, set temperatures and weekly profiles.

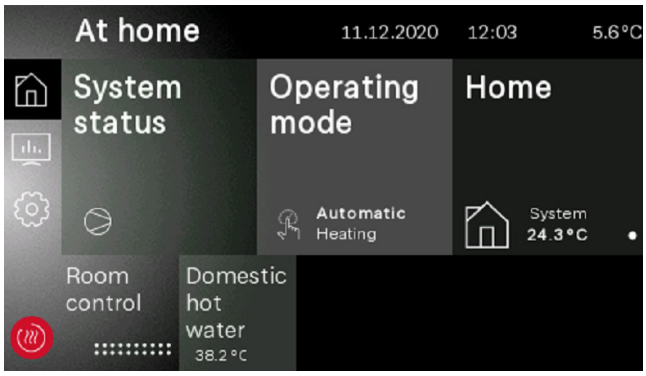


Abb. 2.8: Home view

2.4.2 Analytics

The “Analytics” menu provides all current and historic quantities of thermal energy, runtimes and operating data, as well as the statuses of inputs and outputs.

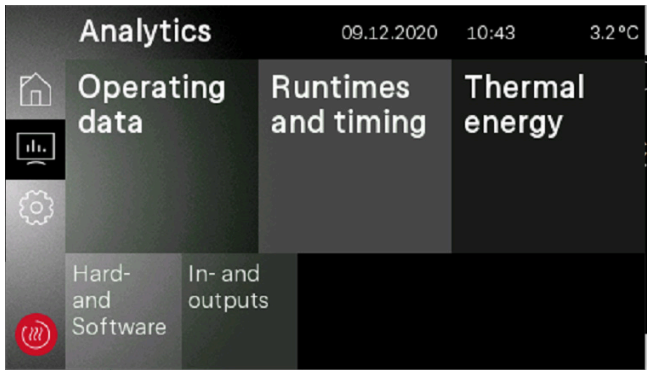


Abb. 2.9: Analytics overview

2.4.3 Settings

The “Settings” menu is used to make the relevant settings for all system parameters, as well as for the display and accessories. Registering for the “Dimplex Home” app is also possible here. If the text on the tiles is greyed out, the function cannot be selected

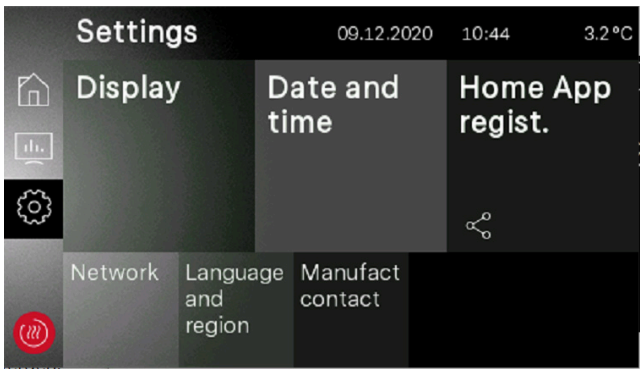


Abb. 2.10: Settings overview

2.4.4 Installation

In the “Installation” menu, after successful commissioning an initial heating program can be activated or “EasyOn” guided commissioning can be started again.

Abb. 2.11: Installation overview

2.4.5 Login

Entry of a password is necessary to access the Specialist and Service area. The password is requested after selecting the user group and then confirming the login symbol.

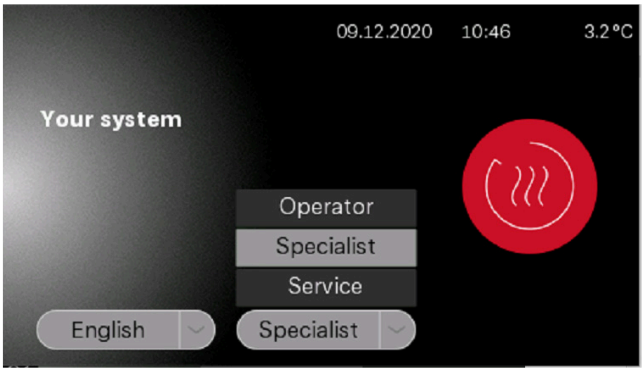


Abb. 2.12: User group selection

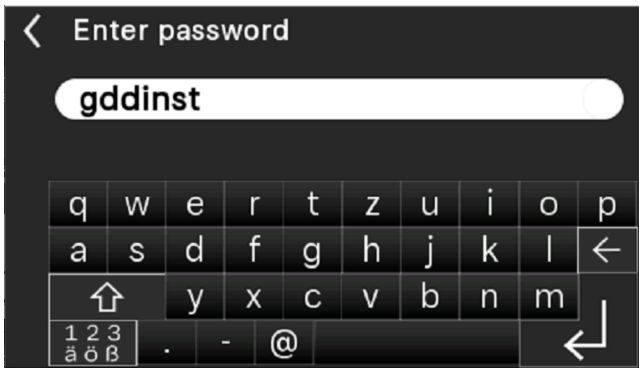


Abb. 2.13: Password entry for Specialist

After entering the correct password and confirming with the Enter key, you are automatically taken to the Specialist home page.

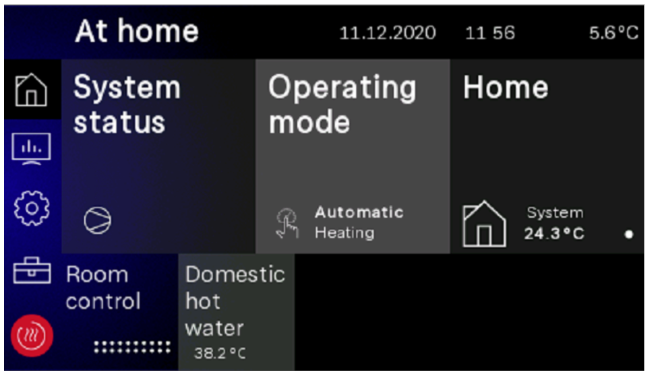


Abb. 2.14: Specialist home page

2.5 Home app registration

The “Dimplex Home” app is available from popular app stores for remote access. After download and registration, the system can be linked to the app by selecting “Settings – Home App Registration”. If it is not already stored and verified, the serial number of the heat pump is first checked for validity. Once this has been completed, a TAN may be requested for linking to the “Home app”. Further information about linking the heat pump to the “Dimplex Home” app is provided in the touch display and in the “Dimplex Home” app itself.

NOTE

For remote access, the NWPM Touch extension available as a special accessory is required. If this hardware is not installed in the WPM Touch, registration is not possible and the text on the tiles is greyed out.

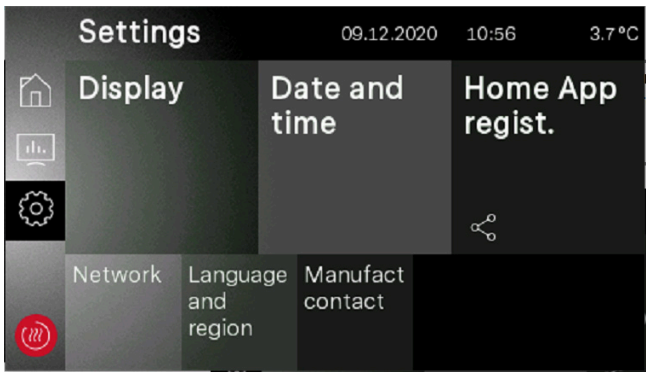


Abb. 2.15: Dimplex Home app registration

3 Initial commissioning

"EasyOn" guided commissioning is carried out by a specialist. It is automatically started and must be completed once. During guided commissioning, all system-specific parameters are requested and the system is set up by the specialist. Initial commissioning must be completed in full before access to the other menu levels is provided.

NOTE

It can be restarted at any time if the specialist selects "EasyON".

Abb. 3.1: EasyOn access

Depending on the factory default settings and the heat pump series, the requested values and settings may be different. Depending on the product, the heat pump, product or system code may be requested.

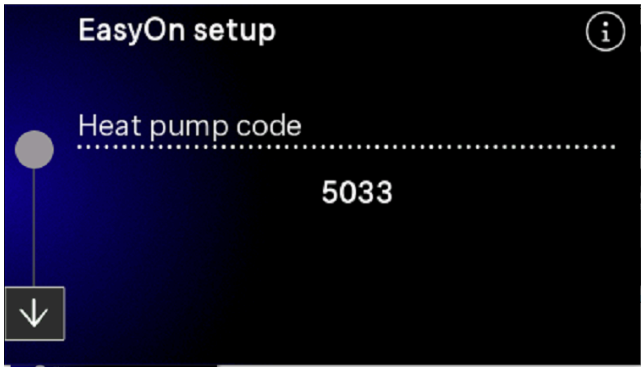


Abb. 3.2: Heat pump code

The heat pump code is factory set and appears on the heat pump rating plate. When selecting functions for the function blocks, correct assignment of the electrical wiring must be ensured.

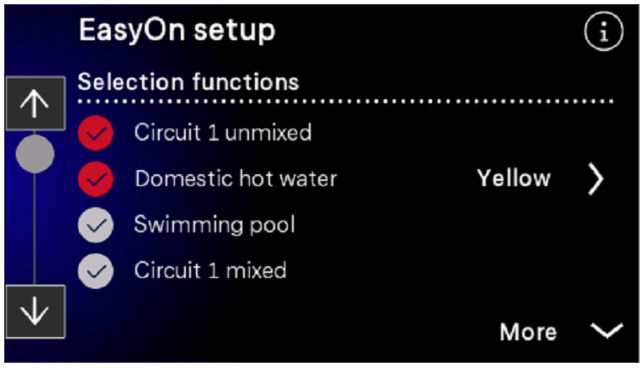


Abb. 3.3: Function selection

The function blocks are pre-assigned but can differ from the actual wiring, in which case they can be changed during commissioning.

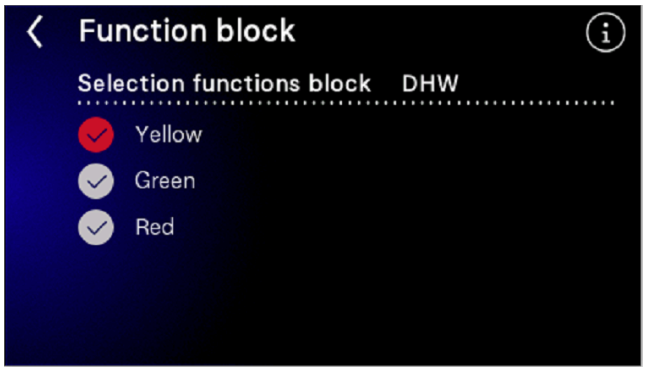


Abb. 3.4: Pre-assignment and changing the function blocks

Further information about the assignments of the function blocks can be found in the installation instructions for the WPM Touch heat pump manager.

4 Operating mode

The “Operating mode” tile can be selected according to the system configuration:

- Summer
- Winter
- Cooling
- Holiday
- Party
- 2nd heat generator
- Automatic operation

.

NOTE

Heat pump operation block
In 2nd heat generator mode, the heat pump is blocked. Heating operation and domestic hot water preparation in mono energy systems is carried out using electric heating elements. In bivalent systems, the 2nd heat generator is used

Cooling Selectable only when the cooling controller is connected		The system operates in cooling mode and individual control functions are activated. This operating mode can only be activated if the heat pump is capable of cooling and the cooling function has been enabled in EasyOn.
Summer		In summer mode, only domestic hot water and swimming pool water are heated by the heat pump. Domestic heating is not activated. (Frost protection is ensured).
Winter		The heat pump operates in heating mode. Programmed lowering times, raising times and shut-off times for heating and hot water heating are activated automatically. Hot water heating, heating and swimming pool water heating are activated according to priority. The heat pump and the 2nd heat generator are connected or disconnected as required.
Holiday (lower operation)		Holiday mode lowers the heating characteristic curves and activates the domestic hot water block. Both functions are independent of any timers, but the lower values set for these functions still apply. The duration of holiday mode can be set in the menu. After this time has elapsed, the system switches automatically back to the previous mode.
Party (daytime mode)		Party mode overrides the programmed lowering of the heating characteristic curves. The duration of party mode can be set in the menu. After this time has elapsed, the system switches automatically back to the previous mode.
2nd heat generator (HG 2)		In this mode, the heat pump is switched off and the entire heat supply is drawn from the 2nd heat generator (HG2). This is the immersion heater in mono energy systems. In bivalent systems, the 2nd heat generator is the oil or gas heating. Time programs and heating curve settings remain active.
Automatic		In automatic mode, the operating mode switches between Winter - Summer - Cooling (if available) depending on the outside temperature. The limit temperatures for automatic mode can be adapted to individual requirements by selecting Settings - Mode - Outside temperature dependent in the menu.

5 Adjustment of heating operation

During commissioning, the heating characteristic curve is adjusted to suit the building and local conditions. This heating characteristic curve can be adapted to individual temperature requirements using the hotter / colder heating curve.

The heating curve can be adjusted separately for each heating circuit based on the outside temperature.

The set heating characteristic curves can be lowered or raised using a weekly profile. For example, in poorly insulated buildings the heating characteristic curve can be lowered at night or excessive cooling of the heating surfaces can be prevented by raising it before the shut-off time.

If the raising and lowering operations overlap each other, the raising operation has priority.

TIP

For energy efficient operation of the heat pump heating system, the temperature level to be generated by the heat pump should be as low as possible.
In well-insulated buildings, constant heating operation without lowering times will normally result in lower energy costs. This is because output peaks with high flow temperatures are avoided and the same degree of comfort is attained at lower temperatures.
Shut-off times can be compensated for by raising the temperature approximately one hour before the shut-off time takes effect.

6 Domestic hot water heating

The settings for domestic hot water heating are made by selecting ***"Settings - System parameters - Domestic hot water"*** in the menu. The heat pump manager automatically calculates the maximum possible hot water temperature for heat pump operation. The desired domestic hot water temperature can be set in the menu.

TIP

As domestic hot water preparation takes place at high flow temperatures and can therefore result in high energy costs, it is advisable to adapt the domestic hot water preparation to the user behaviour. This can be achieved by using domestic hot water set temperatures optimally adapted to requirements, with corresponding domestic hot water blocks and a large hysteresis.

Hot water temperature - HP maximum

To attain the highest possible heat pump ratio during domestic hot water preparation, the heat pump manager automatically calculates the maximum hot water temperature for heat pump operation based on the current heat source temperature. The lower the heat source temperature (e.g. outside temperature, brine temperature), the higher the attainable hot water temperature.

Domestic hot water preparation without a flange heater

If the domestic hot water set temperature exceeds the maximum hot water temperature attainable by the heat pump, domestic hot water preparation is terminated as soon as the "HP maximum temperature" is reached.

Domestic hot water preparation with flange heater

If the domestic hot water set temperature exceeds the maximum hot water temperature attainable by the heat pump, domestic hot water preparation is carried out by the integrated flange heater above the "HP maximum temperature".

NOTE

Reheating with flange heater
After domestic hot water preparation with the heat pump, in systems with a flange heater/pipe heater or 2nd heat generator reheating to higher temperatures is possible. The next domestic hot water heating is not carried out until the temperature falls below the currently valid "HP maximum temperature" minus the set hysteresis. Basic heating is always carried out by operating the heat pump.

6.1 Shut-off times for domestic hot water preparation

When a domestic hot water block is in place, hot water heating is only performed up to the set minimum temperature.
If a sufficiently large cylinder is available, we recommend carrying out domestic hot water heating or reheating during the night-time hours. This means that the more favourable low tariff periods normally available can be utilized.

When using the Smart Grid function, for example using the building's photovoltaic plant, programming shut-off times lasting until the middle of the day is recommended. When Smart Grid is requested, a programmed block is cancelled in order to be able to utilise the electrical energy generated most cheaply for the domestic hot water preparation.

6.2 Thermal disinfection

In bivalent systems or in domestic hot water cylinders with integral flange heaters, thermal disinfection can be carried out at hot water temperatures of up to 85 °C. Thermal disinfection can be carried out for each week day. The start time is selectable. Thermal disinfection has a time limit of 4 hours. With programming over several days, the execution is ended automatically at 00:00 hours.

NOTE

If the set temperature is not reached within 4 hours, the thermal disinfection is terminated. The set start time can be activated or deactivated separately for each day of the week.

6.3 Circulation

Control of the circulation pump can be set using a weekly profile by selecting "***Domestic hot water - Circulation***" in the menu. It is possible to activate a service water circulation pump using a timer program with 2 time windows. A maximum of two circulation time periods can be assigned for each week day. Requests which exceed a day will be activated or deactivated at the end of each day accordingly.

TIP

A circulation pipe is a major energy consumer. To save on energy costs, circulation should not be used. If circulation cannot be avoided, however, it is advisable to adapt the time window to the optimum conditions. It is best to let the circulation run for a specific period using a pulse. This function is also possible with the heat pump manager.

6.4 Domestic hot water circulating pump

The domestic hot water circulating pump (M18) runs during domestic hot water preparation. If a domestic hot water request is made during heating operation, the heat circulating pump is deactivated and the domestic hot water circulating pump is activated when the heat pump is running.

7 Program description

7.1 Limit temperature

The outside temperature at which the heat pump is just able to cover the heat consumption is called the 2nd heat generator limit temperature or the bivalence point. This point marks the transition from heat pump only operation to bivalent operation in combination with an immersion heater or boiler.

The theoretical bivalence point may deviate from the optimum bivalence point. Particularly during transition periods (cold nights, warm days), a lower bivalence point can be used to reduce energy consumption, in accordance with the user's preferences and habits. Therefore, on the heat pump manager a limit temperature for enabling the 2nd heat generator can be set by selecting ***"Settings - System parameters - 2nd heat generator - Limit temperature"*** in the menu.

The limit temperature is normally only used in mono energy systems with air-to-water heat pumps or in bivalent systems in combination with boilers.

A limit temperature of -5 °C should be aimed for in *mono energy* operation. The limit temperature is calculated from the heat consumption of the building depending on the outside temperature and the heat output curve of the heat pump.

7.2 Blocking requests

Different states and settings can result in a heat pump request being blocked. The blocks shown reset automatically or are cancelled once they have been processed.

7.2.1 Utility block

Temporary disconnection of the heat pump may be required by utility companies as a condition for a cheaper electricity tariff. During a utility block, the utility company disable contactor on the heat pump manager is open.

In systems without a utility block, the link cable supplied must be inserted at the relevant terminal points.

The utility block is set by selecting ***"Settings - System parameters - 2nd heat generator - Utility block"*** in the menu.

In bivalent systems, it is possible to react to a utility block in different ways:

Performance level 3 only
Heat pump blocked, the 2nd heat generator is only enabled at performance level 3 (Cap. 7.4 on page 13).

Constant:
The 2nd heat generator is always enabled during the utility block when there is a heat request.

Limit temperature dependent
Heat pump blocked, the 2nd heat generator is enabled below the adjustable limit temperature.

In mono energy and monovalent systems, during a utility block the 2nd heat generator is generally also blocked. The setting for the utility block is hidden.

i NOTE

For an external block on heat pump operation which does not automatically reset after a maximum of 2 hours, the external disable contactor should be used. If the minimum permissible return temperature is not reached, the heat pump is enabled even when a blocking signal is applied.

7.2.2 Line load

The power-up line load is a requirement of the utility companies. It can last for up to 200 seconds after power reconnection or after a utility block. There is no way to bypass the line load.

7.2.3 Minimum pause time

It can take up to 5 minutes for the compressor to switch on again to ensure an adequate pressure balance in the refrigeration circuit and to protect the heat pump. After the minimum pause time has elapsed, the heat pump starts in order to meet any requests that may be pending. There is no way to bypass the minimum pause time.

7.2.4 Switch cycle block

According to the connection conditions set by the utility companies, the heat pump may switch on only 3 times per hour. The heat pump manager will therefore only allow the heat pump to switch on once every 20 minutes at the most.

7.3 2nd heat generator

7.3.1 Control of immersion heaters

Additional electric heaters are used in mono energy systems. These are switched on or off depending on the heat consumption if ***"Heating"*** of the immersion heaters is selected in EasyOn and the set limit temperature (see Cap. 7.1 on page 11) is not reached.

7.3.2 Pipe heater control

In mono energy systems, an electric pipe heater can be used. The electric pipe heater is selected in EasyOn ***"Heating"*** and is switched on or off depending on consumption.

7.3.3 Constantly regulated boiler

With this type of boiler, the boiler water is always heated to a set temperature (e.g. 70 °C) when enabled by the heat pump manager. This temperature must be set sufficiently high that the boiler can also take over domestic hot water preparation if required. The mixer is controlled by the heat pump manager. If required it requests the boiler and adds sufficient hot boiler water to achieve the set return or hot water temperature. The boiler is requested using the output for the 2nd heat generator on the heat pump manager. The operating mode for the 2nd heat generator should be set to "constant".

7.3.4 Gliding regulated boiler

In contrast to constantly regulated boilers, gliding regulated boilers supply a heating water temperature that is directly based on the outside temperature. The 3-way reversing valve has no control function. However, it has the task of directing the heating water flow past or through the boiler, depending on the operating mode.

In heat pump only operation, the heating water is directed past the boiler to avoid losses caused by heat emissions from the boiler. If the system is equipped with atmospherically controlled burner regulation, the voltage supply for burner regulation should be disconnected for heat pump only operation. To do this, the boiler control should be connected at the output for the 2nd heat generator on the heat pump manager and the operating mode for the 2nd heat generator should be set to "gliding". The characteristic curve for burner regulation is set according to the heat pump manager.

7.3.5 Special program for older boilers and main cylinder systems

If the second heat generator has been requested and the special program has been activated by selecting ***"Settings - System parameters - 2nd heat generator"*** in the menu, the 2nd heat generator continues operation for at least 30 hours. If the heat consumption is reduced during this time, the second heat generator goes into "Stand-by mode" (2nd heat generator connected to voltage but mixer closed). It is not fully switched off until there has been no request for the 2nd heat generator for a period of 30 hours.

This function can be used in bivalent systems as follows:

1) To prevent corrosion damage with older oil or gas boilers due to frequent operation below the dew point.
2) In main cylinder systems to ensure that tank charging for the following day is independent of the current heat consumption.

7.3.6 Bivalent-parallel

Selecting ***"Settings - System parameters - 2nd heat generator"*** enables the "Limit temperature parallel" to be set. If the parallel limit temperature is not reached, the heat pump and the 2nd heat generator are requested in parallel if required.

7.3.7 Bivalent-alternative

Selecting ***"Settings - System parameters - 2nd heat generator"*** enables the "Limit temperature alternative" to be set. If the alternative limit temperature is not reached, the heat pump is blocked and the 2nd heat generator is enabled for both heating and domestic hot water preparation.

NOTE

If you want alternative mode to always be used rather than parallel, the alternative and parallel limit temperatures must be set to the same value.

7.3.8 Bivalent-renewable

When integrating a renewable heat source (e.g. solar, wood), this must be given priority over heat pump operation. This is done by selecting ***"Renewable"*** when choosing the function in EasyOn. As long as the renewable cylinder is cold, the system responds like a mono energy system.

The sensor for the renewable cylinder is connected to the analog input (3) of the "Renewable" function block. The mixer outputs for the bivalence mixer are active.

Basic function:

The temperature in the renewable cylinder is measured and compared with the flow temperature for the corresponding request (domestic hot water, heating or swimming pool). If the temperature is above the conditions listed below, the heat pump is blocked, the renewable cylinder is used as the 2nd heat generator and the bivalence mixer is activated.

Block by heating request:

If the temperature in the cylinder is 2-20 K higher than the current flow temperature, the heat pump is blocked when there is a pending heating request. It is not enabled again until the difference between the renewable cylinder and the flow is less than half of the switching value.

NOTE

When integrating solar heat sources, adjust the set overtemperature to the maximum value to prevent the heat pump from surging.

Block by domestic hot water request:

If the temperature in the cylinder is 2-5 K higher than the current hot water temperature, the heat pump is blocked by a pending domestic hot water request. It is not enabled again until the difference between the renewable cylinder and the domestic hot water is less than half of the switching value.

Block by swimming pool request:

If the temperature in the cylinder is higher than 35 °C (value can be set from 10-50 C by selecting Settings - 2nd heat generator - Overtemperature in the menu), the heat pump is blocked by a pending swimming pool request. It is not enabled again until the temperature in the parallel buffer tank is 5K below the switching temperature.

As soon as one of the three blocks described occurs, the heat pump is blocked, and the following message is displayed: HP waiting, Block BR. The 2nd heat generator output is not activated.

Mixer control:

If there is no block by bivalent-renewable, the mixer is switched to continuously CLOSED.

If there is a bivalent-renewable block because of domestic hot water or swimming pool, the mixer is switched to continuously OPEN.

If there is a bivalent-renewable block because of heating, mixer regulation is active.

7.4 Performance regulation

The heat pump manager defines a maximum of 3 performance levels, L1, L2 and L3, which it activates depending on the heat consumption. Rising heat consumption activates the next higher performance level, falling heat consumption the next lower stage.

L1: Heat pump operates with one compressor

L2: Heat pump operates with two compressors

L3: Heat pump running and 2nd heat generator active (not in monovalent systems)

- The heat pump manager always starts at performance level L1 after commissioning or a power failure.
- The performance levels are not redefined during defrosting, swimming pool water preparation, domestic hot water request or a utility block.

7.4.1 Heat pumps with one compressor

Criteria for switching:

- From L1 to L3 if the heat pump manager demands "more heat" for more than 60 minutes and the outside temperature simultaneously remains below the limit temperature for the 2nd heat generator for longer than 60 minutes
- From L3 to L1 if the heating controller demands "less heat" for more than 15 minutes or the limit temperature is exceeded.

7.4.2 Heat pumps with two compressors

Criteria for switching:

- From L1 to L2 if the heat pump manager demands "more heat" for more than 25 minutes,
- From L2 to L3 if the heat pump manager demands "more heat" for more than 60 minutes and the outside temperature is simultaneously below the limit temperature for more than 60 minutes,
- From L3 to L2 or L1 if the heat pump manager demands "less heat" for more than 15 minutes or the limit temperature is not reached,
- From L2 to L1 if the heat pump manager demands "less heat" for more than 15 minutes.

At performance level L1, a heat pump compressor is switched on or off according to the "more" or "less" signals from the heat pump manager. At level L2, one heat pump compressor runs continuously to cover the base load. The second compressor is switched on or off according to the "more" or "less" signals from the heat pump manager. At level L3, both compressors run continuously to cover the increased base load and the second heat generator is regulated. Only one compressor ever operates during defrosting.

Performance level	Heat pump with one compressor	Heat pump with two compressors
Level L1	Only one compressor switching	Only one compressor switching
Level L2	-	1 compressor base load, 1 compressor switching
Level L3	One compressor and second heat generator, if required	Both compressors and second heat generator
Defrost	Compressor running	One compressor running
Hot water heating	Compressor running	One or two compressors running depending on outside temperature
Swimming pool heating	Compressor running	One or two compressors running depending on outside temperature

7.4.3 High temperature air-to-water heat pumps

Only 1 compressor normally runs at outside temperatures above 10 °C. If the outside temperature is below 10 °C and the flow temperature is higher than 50 °C, both compressors are enabled:

The 1st compressor is activated first, followed shortly by the 2nd compressor. If the request is no longer pending or a block is activated, both compressors are switched off simultaneously.

In terms of the performance level, the high temperature heat pump responds like a heat pump with 1 compressor in this temperature range regardless of the selection in the Configuration menu, i.e. there is no performance level 2.

If the conditions for switching to performance level 3 as specified in Cap. 7.4.1 on page 13 are fulfilled, the 2nd heat generator is enabled.

7.5 Hysteresis

The so-called hysteresis for different requests can be set by selecting ***-"Settings - System parameters"*** in the menu. The hysteresis forms a "neutral zone" around the corresponding set temperature. If the current temperature is lower than the set temperature reduced by the hysteresis, a request is then recognised. This request remains pending until the current temperature exceeds the upper limit of the neutral zone. This results in a switching cycle around the setpoint.

Return set temperature hysteresis

A hysteresis can be set around the return set temperature for the heating request.

If the hysteresis is large, the heat pump will operate for longer, which means that the temperature fluctuations in the return are correspondingly large. A smaller hysteresis reduces the compressor running times and the temperature fluctuations.

NOTE

For panel heating with relatively flat characteristic curves, set a hysteresis of approx. 1 K, as a hysteresis that is too large can prevent the heat pump from switching on.

7.6 Control of circulating pumps

Control of the heating, domestic hot water or swimming pool circulating pumps determines where the heat generated by the heat pump will flow. Individual processing of different requests enables the heat pump to always be operated at the lowest possible system temperatures, thus ensuring energy efficient operation.

With heat pumps for heating and cooling, additional cooling circulating pumps can be controlled (Cap. 10 on page 21).

NOTE

Pump units with check valves maintain the specified flow direction.

NOTE

In summer operating mode, the heating pump operates for around 1 minute every 150 hours. This prevents the heating pump from seizing.

7.6.1 Frost protection

Regardless of the settings for the heat circulating pumps, they always runs in heating and defrost mode and if there is a risk of frost. In systems with multiple heating circuits, the 2nd/3rd heat circulating pump has the same function.

⚠ CAUTION!

To ensure that the frost protection function on the heat pump works properly, the heat pump manager must remain connected to the power supply and the flow must be maintained through the heat pump at all times.

7.6.2 Heat circulating pump

Pump optimisation depending on the outside temperature for both heating and cooling is set for the heat circulating pump (M13, M15, M20) by selecting **"*Settings - System parameters - Pump control*"** in the menu.

If the temperature falls below the selected limit temperature, heating pump optimisation is inactive. With the exception of domestic hot water preparation, swimming pool water preparation and in "*Summer*" mode, the heat circulating pumps operate continuously.

If the temperature rises above the selected limit temperature, heating pump optimisation is active. The heat circulating pumps continue to run for 30 minutes after a power up and after switch off of the heat pump. If the heat circulating pumps have been switched off for longer than 40 minutes or if the return set temperature has been intentionally increased by raising it, the heat circulating pumps are activated for a 7 minute rinse time to return the return sensor (R2,R2.1) to the representative temperature of the heating circuits.

When switching from heating water to domestic hot water or swimming pool water preparation, the heat circulating pump overruns.

The heat circulating pumps are operated continuously when the temperature falls below the minimum system temperatures and at temperatures lower than 10 °C on the frost protection sensor (R9) on air-to-water heat pumps.

NOTE

In summer operating mode, the circulating pump operates for 1 minute every 150 hours. This prevents the shaft from seizing.

7.6.3 Domestic hot water circulating pump

The domestic hot water circulating pump (M18) runs during domestic hot water preparation. If a domestic hot water request is made during heating operation, the heat circulating pump is deactivated and the domestic hot water circulating pump is activated when the heat pump is running.

On heat pumps with an additional heat exchanger and "*Setting – Parallel heat - DHW*" set to *"Yes"*, the domestic hot water pump operates in parallel to the heat circulating pump during heating operation until the set maximum temperature is reached.

7.6.4 Swimming pool circulating pump

The swimming pool circulating pump (M19) runs during swimming pool water preparation. Swimming pool water preparation can be interrupted at any time by a domestic hot water request, defrosting or by raising the heating characteristic curve (e.g. after lowering the temperature at night), but not by a "more" signal from the heat pump manager. If the request is still pending after swimming pool water preparation has been running for 60 minutes, the swimming pool circulating pump is deactivated for 7 minutes and the heat circulating pump is activated for a 7 minute rinse time to supply the return sensor with the representative temperature of the heating circuit again. If the heat pump manager generates a "more" signal during these 7 minutes, the heating request is processed first.

NOTE

In the summer operating mode, swimming pool water preparation is not interrupted after 60 minutes by a rinse time.

7.6.5 Auxiliary circulating pump

The auxiliary circulating pump output (M16) can be configured to allow parallel operation of the auxiliary circulating pump and the heat pump compressor. Configuration is possible for heating water, domestic hot water and swimming pool water preparation. It also runs if the minimum system temperatures are not reached.

NOTE

In summer operating mode, the circulating pump operates for 1 minute every 150 hours. This prevents the shaft from seizing.

7.6.6 Primary pump for heat source

The primary pump (M11) supplies the energy from the heat source to the heat pump

Heat pump type	Primary pump
Air-to-water heat pump	Fan
Brine-to-water heat pump	Brine circulating pump
Water-to-water heat pump	Well pump

The well water or brine circulating pump always operates when the heat pump is switched on. It starts 1 minute before and switches off 1 minute after the compressor.

On air-to-water heat pumps, the fan is switched off during defrosting.

7.6.7 Circulation pump

If the option of connecting a circulation pump (M24) is available, the pump can be requested using an input pulse or using time programs.

If the circulation pump is requested by the pulse input, the delay time can be specified under **"*Settings - System parameters - Domestic hot water*"** in the menu. If the request is made using a time program, the program can be set for two different times and days of the week.

TIP

A circulation pipe is a major energy consumer. To save on energy costs, circulation should not be used. If circulation cannot be avoided, however, it is advisable to adapt the time window to the optimum conditions. It is best to let the circulation run for a specific period using a pulse. This function is also possible with the heat pump manager.

7.7 Building management system

From software version L09, there are two options for connecting the heat pump to a building management system.

- Transferring the default values via the BMS (Building Management System) using an interface. A variety of different protocols and interfaces are available for this purpose (Cap. 7.7.1 on page 16).
- Wiring digital inputs with the option of influencing the power regulation outlined in Cap. 7.4 on page 13 on the heat pump manager. There is also the option of setting the operating mode from heating to cooling using digital inputs and also using a configurable external block (frost protection/domestic hot water/holiday/summer) (Cap. 7.7.2 on page 16).

⚠ CAUTION!

In all cases, the primary pump (M11) and the secondary pump (M16) or the heat circulating pump (M13) depending on hydraulic integration must be connected to the heat pump manager. This is the only way to ensure the pump flows and returns necessary for operation and to ensure that the necessary safety measures are in place

7.7.1 BMS interface

The extensions available as special accessories are available on the BMS interface for connecting to:

- LAN
- KNX
- Modbus

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These extensions enable the operating data and the history to be read and settings made such as mode or nominal values.

As a general rule, a heat pump request via an interface is preferable in conjunction with building management systems.

If an interface is used, we suggest the following programming on the heat pump manager. Depending on the number of heating or cooling circuits, they are set to fixed setpoint regulation. The set temperature calculated by the BMS is transferred to the heat pump manager as a fixed value temperature. The BMS also switches the heat pump to Auto,Summer and Cooling mode.

Further information on these options is available in the description for the relevant product.

7.7.2 Compressor control via digital inputs

In addition to a nominal value defined by the BMS, it is also possible to control the compressor via digital inputs.

Performance levels

The performance levels (L) are influenced using two digital inputs. Table 5.1 shows an overview of the performance level switching.

Performance level	Digital 1	Digital 2
Level L1	Closed	Open
Level L2	Open	Closed
Level L3	Closed	Closed

Abb. 7.1:Overview of performance levels

Performance level switching takes place in the sequence outlined in Cap. 7.4 on page 13 Performance regulation.

Note that the building management system can increase or reduce the performance levels within the operating limits. This does not override the utility companies' technical connection conditions. The set temperatures on the heat pump manager are ignored. The heat pump is only blocked under extreme circumstances by the operating limits (high and low pressure, flow and return temperature) or switched off by safety functions.

Table 5.2 highlights the performance level switching and its effects on the compressor and the 2nd heat generator or refrigerator.

Switching performance levels

With parallel connection of heat pumps, it is advisable to set up and program the performance levels using a ring connection. This means that, depending on the performance required, heat pump 1 is enabled at L1, followed by heat pump 2 at L1 and heat pump 3 at L1. If more performance is required, heat pump 1 is enabled at L2, followed by heat pump 2 at L2 and heat pump 3 at L3. Switching back takes place in the same way. First of all, heat pump 1 is switched to L1, heat pump 2 to L1 and then heat pump 3 to L1. This not only ensures that the compressors are assigned the same runtimes, but also that the heat pumps are operated in the most effective way.

Performance level	Description	Compressor 1	Compressor 2	2nd heat generator/ refrigerator
Level L1	Set temperature - hysteresis	On	Off	Off
	Set temperature + hysteresis	Off	Off	Off
Level L2	Set temperature - hysteresis	Always on	On	Off
	Set temperature + hysteresis	Always on	Off	Off
Level L3	Set temperature - hysteresis	Always on	Always on	On
	Set temperature + hysteresis	Always on	Always on	Off

Abb. 7.2:Example of performance level switching

When programming performance level switching using the building management system, the minimum pause time (Cap. 7.2.3 on page 11), switch cycle block (Cap. 7.2.4 on page 11) and, where applicable, the utility block (Cap. 7.2.1 on page 11) relevant for the heat pump must be taken into account.

7.7.3 External block

The heat pump can be blocked or enabled for one of the following functions using the digital input:

- Frost protection
- Heat pump maintains minimum system temperatures, domestic hot water and swimming pool preparation is blocked
- Domestic hot water block
- Heat pump is enabled, minimum domestic hot water temperature is maintained
- Holiday mode
  - Heat pump maintains lower value, domestic hot water is blocked
- Summer mode
  - Heat pump maintains minimum system temperature, domestic hot water and swimming pool preparation is enabled

External block	Status
Active	Open
Inactive	Closed

Abb. 7.3:*Overview of block function

Frost protection is guaranteed at all times.

If “Performance level switching” and “External block” are to be used, these functions must be activated by the after-sales service during commissioning of the heat pump.

7.7.4 Switching heating/cooling

On heat pumps for heating and cooling, the operating mode can be switched using a digital input.

Operating mode	Status
Heating	Open
Cooling	Closed

Abb. 7.4:Overview of heating/cooling switching

8 Commissioning of air-to-water heat pumps

To ensure defrosting for air-to-water heat pumps, the return temperature must be at least 18 °C, in order to prevent defrosting being interrupted due to the minimum permissible temperature at the frost protection sensor not being maintained.

Activation of the commissioning function (special function) is enabled for a period of one hour for the 2nd heat generator, defrosting is suppressed or defrosting currently in progress is aborted.

The heat circulating pump operates continuously during commissioning and domestic hot water or swimming pool water requests are ignored.

NOTE

At low heating water temperatures, heat up the buffer tank first before gradually opening the individual heating circuits.

9 Initial heating program (drying of screed flooring)

Initial heating of the screed flooring is carried out according to the applicable standards and directives. However, these must have been adapted to suit the requirements of a heat pump heating system (Cap. 9.1 on page 19).

The individual programs are activated under ***"Installation - Initial heating program"*** in the menu.

During initial heating, the following applies:

- The heat circulating pumps for the 1st, 2nd and 3rd heating circuits run continuously
- Programmed lowering or raising of the temperature is overridden. A fixed hysteresis of ± 0.5 K applies (regardless of the configuration in the menu)
- Limit temperature for the 2nd HG is fixed at +35 °C (regardless of the configuration in the menu)
- The calculated set temperature applies for all heating circuits
- The mixer for the 2nd/3rd heating circuit is activated continuously open
- In the case of a fault or voltage interruption, only the selected program is interrupted. After the voltage is restored or the fault is acknowledged, the relevant program step is continued.
- The heat pump manager records the data in the HISTORY for the last initial heating program that was completed.

NOTE

If the manufacturer has not stipulated any special requirements, we recommend using the standard program for screed drying (max. return temperature 35-40 °C).

9.1 Implementing the heat pump heating system directive

The directive is based on whole days for which a specified temperature is to be reached or maintained.

If the screed flooring has a high moisture content, the specified temperatures are often not reached within the prescribed period of time. For the flooring to be sufficiently dried out, however, it is essential that the temperature level is maintained for a definite period.

For this reason, the days described in the standard are implemented as program steps. One program step corresponds to the combination of the number of days and/or hours and the corresponding temperature.

⚠ CAUTION!

Depending on the ratio between the heat output of the heat pump and the living area to be heated, the specified minimum heating-up period can be exceeded considerably. This is because the required minimum number of hours is not totalled until after the set temperature has been reached.

The relevant standards and directives always refer to the flow temperature of the heating system. Regulation of the heat pump is based primarily on the return temperature.

NOTE

The maximum return temperature must be entered for the initial heating program. This is given by the max. flow temperature minus the temperature spread (e.g. 7 K).

9.2 Heating function program in compliance with DIN EN 1264-4

This program is a recognised function test for underfloor heating and is carried out after the prescribed waiting time for screed flooring.

This is intended to highlight any shortcomings in the screed flooring and the underfloor heating

1). Schritt A constant return temperature of 20 °C is to be maintained for 72 hours (3 days).

2). Schritt The maximum return temperature (adjustable) is to be maintained for 96 hours (4 days).

3). Schritt The heat pump remains off until the return temperature has fallen below 20 °C.

The period for step 3 is limited to a maximum of 72 hours because the return temperature may not fall below 20 °C at high outside temperatures.

⚠ CAUTION!

The heating function program is used to test the function of the heated floor. The test must not be carried out any earlier than 21 days after completion of the screed work in the case of a cement floor and 7 days in the case of a calcium sulphate floor.

After completion of the screed flooring, the appropriate waiting time and the heating function program, determining whether the screed is dry is a prerequisite for fitting the final floor covering.

9.3 Screed drying

9.3.1 General information

This program is used to reduce the moisture in the screed flooring to such an extent that the floor covering can be laid.

However, it is still mandatory to measure the moisture content of the floor as it may be necessary to continue the drying-out process.

The directive regarding drying out screed flooring calls for a fixed number of steps with specified temperatures and times. This sequence can be selected under *"Screed drying - Standard program"* in the menu.

In consultation with your screed flooring contractor, the standard program should normally be used. It is only necessary to individually adapt the specified sequence in the standard program if there are any special initial heating requirements. This can be set by selecting ***"Installation - Initial heating programs - Screed drying"*** in the menu.

9.3.2 Standard program for screed drying

This program consists of 8 steps and is normally suitable for all underfloor heating systems. Before activation, the maximum permissible return temperature, e.g. 32 °C must be entered.

Step 1-4:	Heating up sequences
Step 5:	Maintenance
Step 6-8:	Heating down sequences

Steps 1 to 4 are heating up sequences with a duration of 24 hours each. The return set temperature is raised from 20 °C to the maximum return temperature in each step.

Two conditions must be met to end a program step. The associated set temperature must be reached or exceeded and the 24-hour period must have elapsed. If the temperature is reached before the 24-hour period has elapsed, the heat pump maintains the associated set temperature throughout the remaining period. No evaluation is made of how long this temperature was actually attained.

In Step 5, the maximum return temperature should be maintained for a period of 264 hours.

The periods in which the maximum return temperature was actually reached are totalled up. Upward limit open, downward limit set value - hysteresis.

This program step is not ended until the total time reaches a value of 264 hours.

Steps 6 to 8 are heating down steps with a duration of 24 hours each. The return set temperature is lowered from the maximum return temperature to 20 °C with every step.

Two conditions must be met to end a program step. The temperature must be below the associated set temperature and the 24-hour period must have elapsed. If the temperature is below the set value before the 24-hour period has elapsed, the heat pump maintains the associated set temperature throughout the remaining period. However, no evaluation is made of how long this temperature was actually attained.

The period for the heating down sequences is limited to a maximum of 72 hours because the temperature may not fall below the required return temperature at high outside temperatures.

Example:

Max. return temperature: 32 °C

Step 1-4:	20 / 24 / 28 / 32 °C
Step 5:	Maintenance
Step 6-8:	28 / 24 / 20 °C

9.3.3 Individual program for screed drying

The extended options for the individual program are also set by selecting ***"Installation - Initial heating programs- Screed drying"*** in the menu.

- *Heat up temperature difference:*
  Starting from the initial temperature of 20 °C up to the set maximum temperature, the set temperature is raised by the set difference at every program step.
  The number of steps depends on the following factors.
- *Heating-up period:*
  The number of hours can be entered here within which the corresponding set temperature must be reached and maintained (function as described above).
- *Maintaining time period:*
  The number of hours can be entered here for which the maximum set temperature must be maintained.
- *Heating-down temperature difference:*
  Starting from the set maximum temperature down to the initial value of 20 °C, the set temperature is reduced by the set difference at every program step.
  The number of steps depends on the following factors.
- *Heating-down period:*
  The number of hours can be entered here in which the corresponding set temperature must be reached and should be maintained.

10 Cooling

10.1 Active cooling

Cold is generated actively by reversing the process in the heat pump. The cooling circuit is switched from heating to cooling operation using an internal four-way reversing valve.

NOTE

The heat pump is blocked for up to 10 minutes when switching from heating to cooling operation. This allows the different pressures in the cooling circuit to equalize.

Requests are processed as follows:

- Domestic hot water before
- Cooling before
- Swimming pool

The heat pump operates as for heating operation during domestic hot water or swimming pool water preparation.

10.1.1 Additional heat exchanger for waste heat recovery

An additional heat exchanger in the refrigeration circuit enables the waste heat produced during cooling to be used for domestic hot water or swimming pool water preparation. The heat exchanger menu item must be set to *"YES"* to do this.

Requests are processed as follows:

- Cooling before
- Domestic hot water before
- Swimming pool

Select ***"Settings - System parameters - Domestic hot water"*** in the menu to set the maximum temperature under *"**Parallel operation heating – Domestic hot water**"*. As long as the hot water temperature remains below this limit, the domestic hot water circulating pump runs during cooling. Once the set maximum temperature has been reached, the domestic hot water circulating pump is switched off and the swimming pool circulating pump is switched on (independent of the swimming pool thermostat input).

If there are no cooling requests, domestic hot water or swimming pool requests can be processed. However, if cooling has been requested, these functions are each cancelled after a maximum continuous runtime of 60 minutes and priority is given to the cooling request.

10.2 Passive cooling

In the summer, the ground and the ground water are significantly colder at greater depths than the ambient temperature. A plate heat exchanger installed in the ground water or brine circuit, transfers the refrigeration capacity to the heating / cooling circuit. The heat pump compressor is not active and is therefore available for domestic hot water preparation. Parallel operation of cooling and domestic hot water preparation can be activated by selecting ***"Settings -System parameters - Domestic hot water - Parallel HW cooling"*** in the menu.

NOTE

Ensure that the special hydraulic integration requirements are met for parallel operation of cooling and domestic hot water preparation (see project planning documentation).

The behaviour of the primary pump (M11), the primary cooling pump (M12) and the heat circulating pump (M13) for cooling operation can be changed under "***Settings - System parameters - Pumps***".

10.3 Cooling operating mode

The cooling functions are activated manually as a 6th operating mode. Switching of the "Cooling" operating mode is also possible depending on the outside temperature. External switching is possible via input N17.1-J4-ID4.

The *"Cooling"* operating mode can only be activated if the cooling function (active or passive) has been enabled in the preconfiguration.

Switching off cold generation

The following limits are provided as safeguards:

- The flow temperature falls below a value of 7 °C
- Activation of the dew point monitor at vulnerable points in the cooling system
- The dew point is reached with silent cooling only

10.4 Activation of cooling functions

Special control functions are performed when cooling operation is activated. The cooling controller performs these cooling functions independently of the remaining control functions.

The cooling functions can fail to activate due to the following reasons:

- The outside temperature is below 3 °C (danger of frost)
- The outside temperature is below the operating limit for cooling with reversible air-to-water heat pumps.
- There is no cooling controller fitted or the connection is broken (I/O extension).
- Neither silent nor dynamic cooling has been selected in the heating/cooling circuit settings

In all these cases, cooling mode will remain active. However, the control system responds as in summer mode.

10.5 Circulating pumps in cooling operation

In a heat pump heating system, the preconfiguration of the relevant heating circuits defines which circulating pumps are activated or deactivated in which operating mode.

The heat circulating pump for the 1st heating circuit (M14) is not active for cooling operation if silent cooling only is configured.

The heat circulating pump for the 2nd heating/cooling circuit (M15) is not active if only “Heating” has been selected.

The heat circulating pump for the 3rd heating/cooling circuit (M20) is not active if only “Heating” has been selected.

NOTE

The floating contact N17.2 / N04 / C4 / NC4 can be used for switching the heating components in heating or cooling operation (e.g. room temperature controller)

Passive cooling

The cooling system can be supplied using either the existing heat circulating pump (M13) or an additional cooling circulating pump (M17).

NOTE

The cooling circulating pump (M17) operates continuously in “Cooling” mode.

With passive cooling, the operating behaviour of the heat circulating pump (M13) can be changed depending on the hydraulic integration by selecting *“**Settings - Pump control**”*.

10.6 Silent and dynamic cooling

Different system configurations can be implemented according to each integration diagram.

- **Dynamic cooling** (e.g. fan convectors)
  Control corresponds to a **“Fixed value temperature**”. This is done by setting the desired return set temperature under Settings in the menu.
- **Silent cooling** (e.g. underfloor cooling, wall panel cooling or cooled ceilings)
  Control is based on the **“Room temperature”**. The room temperature is decisive, where the room climate station 1 is connected as shown in the connection diagram. Set the desired room temperature under "Settings" in the menu.
  The maximum transferable cooling capacity for silent cooling is heavily dependent on the relative humidity. High humidity reduces the maximum cooling capacity, because the flow temperature cannot be lowered any further once the calculated dew point has been reached.
- **Combination of dynamic and silent cooling**
  Control is carried out separately in two different control circuits.
  The dynamic circuit is controlled based on a fixed value (as described for dynamic cooling).
  Silent cooling is controlled based on the room temperature (as described for silent cooling) by operation of the mixer for the 2nd/3rd heating circuit (silent heating/cooling circuit).

NOTE

If the refrigerator switches off because the minimum flow temperature of 7 °C has been reached, then either the water flow has to be increased or a higher return set temperature has to be set (e.g. 16 °C).

10.7 Room temperature control

Heating systems are normally equipped with an automatic mechanism for separately regulating the room temperature in each room.

The room thermostats measure the current temperature for heating operation. If the current temperature is below the set temperature, the thermostats activate the control device (e.g. actuator).

For cooling operation, the room thermostats must be either deactivated or replaced with units which are suitable for both heating and cooling.

The room thermostat responds inversely for cooling operation, i.e. if the set temperature exceeds the current temperature, the control device is activated.

11 Error history

The heat pump is blocked during faults. In bivalent systems, the second heat generator takes over heating and domestic hot water preparation. In mono energy systems, domestic hot water preparation is stopped. The immersion heater maintains the minimum permissible return temperature.

The heat pump manager displays current faults in plain text. The heat pump is blocked. After rectifying the fault, the heat pump can be restarted. (Switching off the control voltage also acknowledges an existing fault.)

NOTE

In mono energy systems, switching to 2nd heat generator mode enables the heating to be carried out by the immersion heater and domestic hot water preparation by the flange heater.

Low pressure brine controller

If the "low pressure brine controller" available as a special accessory is installed in the primary circuit of a brine-to-water heat pump, a fault is reported if there is a fall in brine pressure.

Faults - Alarm - Block diagnostics

Selecting “Info - Error history/Block history” in the menu displays the last 10 causes of a fault and block that occurred. The date, time, heat source temperature, flow temperature, return temperature and the status message are displayed.

Fault code	Fault	Message	Action
F1	Extension N17.1	“General cooling” extension module is not detected	• Connection cable Check - Line interrupted - Plug loose - Individual lines mixed up • Power supply Check
F2	Extension N17.2	“Active cooling” extension module not detected.	
F3	Extension N17.3	“Passive cooling” extension module not detected.	
F5	Extension N17	“Cooling” extension module not detected.	
F6	Electronic expansion valve	Electronic expansion valve not detected.	
F7	RTH room modulator Econ	Reference room modulator not detected.	
F8	ODU extension	Refrigeration circuit controller not detected	
F10	WPIO extension		
F15	Sensors	There is a fault with the required sensors; the exact cause is shown in the plain text display.	
F16	Brine pressure monitor	The brine pressure monitor in the brine circuit has tripped.	• Check the brine pressure
F19	Primary circuit	Fault caused by primary pump or fan motor protection	• Primary pump / fan motor protection • Check setting and/or function
F20	Defrost	Defrosting of the air-to-water heat pump could not be initiated or could not be finished properly. There are multiple possible causes for this message.	• Check heating water flow rate • Check heating water pressure • Check flow temperature and return temperature • Inform after-sales service
F21	Brine pressure monitor	The brine pressure monitor in the brine circuit has tripped.	• Check the brine pressure
F22	Domestic hot water	Domestic hot water temperatures in heat pump mode below 35 °C	• Domestic hot water circulating pump flow too low • Heating check valve defective • Check domestic hot water sensors
F23	Compressor load	Incorrect direction of rotation Phase failure Compressor start-up too long Compressor operating current undervoltage too high Soft starter overtemperature Incorrect mains frequency	• Check rotary field • Check supply voltage • Inform after-sales service
F24	Coding	Coding does not correspond to the heat pump type	• Read off the detected heat pump type in the Version overview menu

Fault code	Fault	Message	Action
F25	Low pressure	The heat source is producing insufficient energy	• Clean the dirt trap filter • Purge the heat source system • Check brine / water flow • Inform after-sales service • Evaporator iced up or system temperatures too low (return < 18°C)
F26	Frost protection	The flow temperature in heating operating mode is below 7 °C.	• Raise heating water temperature
F28	High pressure	The heat pump has been switched off by the high pressure sensor or pressure switch.	• Set heating curve lower • Increase heating water flow rate • Check overflow valve
F29	Temperature difference	Temperature difference between flow and return is too large (>12 K) or negative for defrosting.	• Check heating water flow rate • Check overflow valve and pump size • Flow and return mixed up
F30	Hot gas thermostat		• Inform after-sales service
F31	Flow	The heat pump has been switched off because there is no flow in the primary or secondary circuit.	• Insufficient water flow in the well or brine circuit • Insufficient water flow in the secondary circuit • Incorrect flow direction

12 Block history

Block code	Block	Short description
S5	Functional check	The functional check has been activated by a user.
S7	System control	The system control has been activated by a user for approx. 24 hours.
S8	Delay Operating mode switching	The delay time protects the heat pump from a rapid temperature change when cooling water and hot water is requested.
S9	Pump flow	The heat pump starts after the set pump flow has passed
S10	Minimum pause time	After the minimum pause time has elapsed, the heat pump starts in order to meet any requests that may be pending. The minimum pause time protects the heat pump and can last for up to 5 minutes.
S11	Line load	After the switch-on delay has elapsed, the heat pump starts in order to meet any requests that may be pending. The switch-on delay is required by utility companies after the voltage is restored or after a utility block. It can last for up to 200 seconds.
S12	Switch cycle block	After the switch cycle block has elapsed, the heat pump starts in order to meet any requests that may be pending. The switch cycle block is required by utility companies and can last up to 20 minutes.
S13	Domestic hot water reheating	Domestic hot water reheating via the flange heater or pipe heater is active
S14	Renewable	If “Bivalent-renewable” mode is selected, the temperature in the cylinder is high enough for the cylinder to process the pending request.
S15	Utility block	A utility block is in place.
S16	Soft starter	Heat pump switch-off due to soft starter
S17	Flow	The heat pump has been switched off because there is no flow in the primary or secondary circuit. The message is automatically reset after 4 minutes.
S18	2nd heat generator	The heat pump has been blocked due to the outside temperature being too low and the 2nd heat generator has been activated
S19	High pressure	The heat pump's permissible high pressure values have been exceeded.

Block code	Block	Short description
S20	Low pressure	Pressure is below the heat pump's permissible low pressure values.
S21	Operating limit	The heat source temperature is below the heat pump's operating limit.
S22	4-way valve	The 4-way valve has not reset to its initial state after defrosting.
S23	System limit	The system temperatures are too low for the heat pump to be operated.
S24	Primary circuit load	The heat pump has been disabled by the fan motor protection. The heat pump restarts by itself.
S25	External block	The system has been switched to blocking status due to an external blocking signal at input ID4. The functionality can be configured in the menu.
S33	Electronic expansion valve initialisation	Establishing communication with the electronic expansion valve
S34	2nd heat generator	The 2nd heat generator operating mode has been selected. The heat pump is switched off. Heat generation is provided exclusively by the 2nd heat generator

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