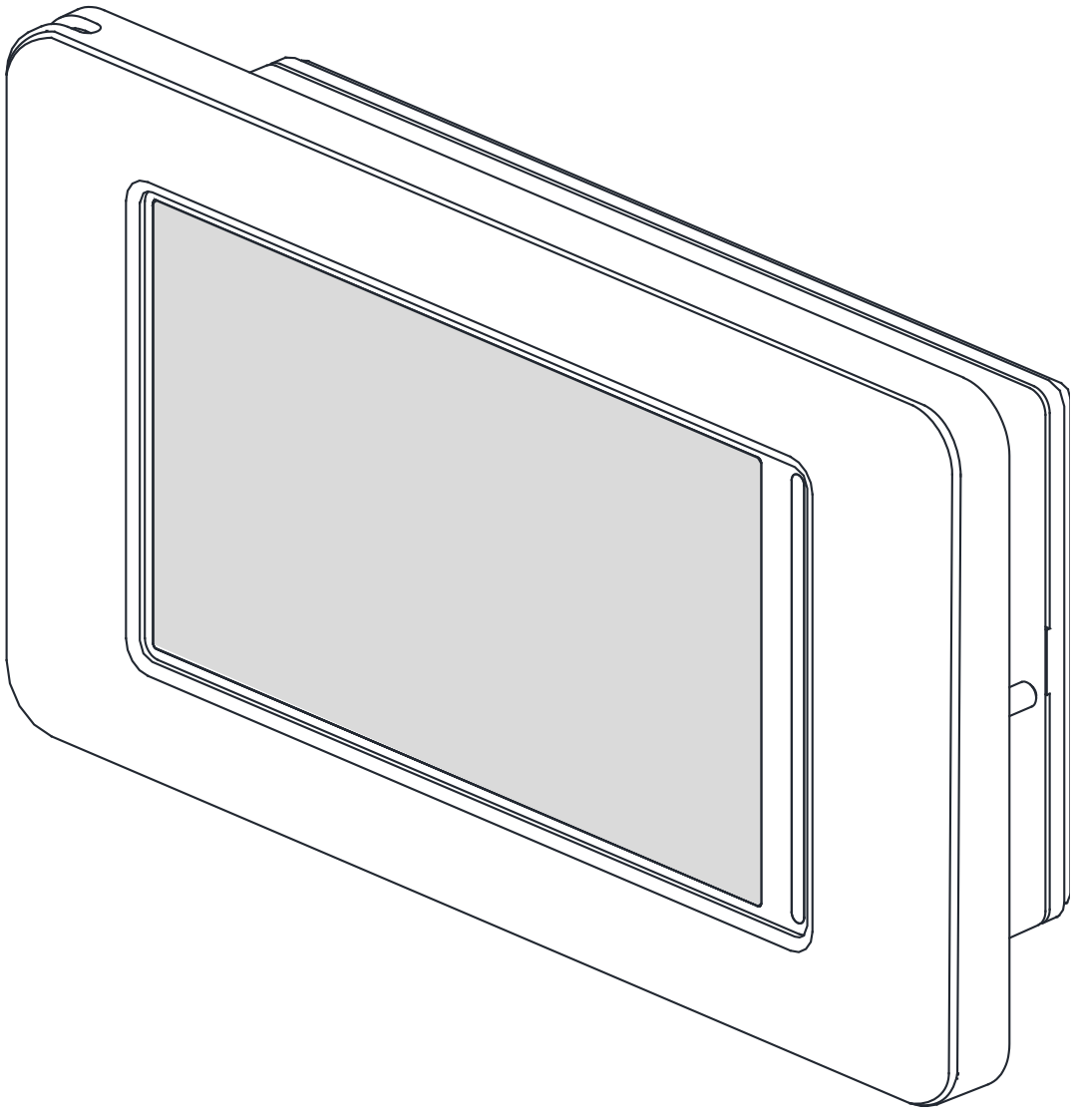
–weishaupt–

manual

Operating manual



Heat pump manager WPM 6.0

83323202 · 1/2024-04

1 User instructions

1.1 General

The installation and operating instructions must be observed during installation, operation and maintenance. This device may only be installed and repaired by trained specialists. Incorrect repairs can result in significant danger for the user. According to the valid regulations, the installation and operating instructions must be available at all times and be handed over to the specialist for their information when working on the device. We therefore ask that the instructions be handed over to the new tenant or owner when moving house. If there is visible damage on the device, it must not be connected. In this case, always consult with the supplier. Ensure that only genuine spare parts are used to avoid consequential damage. Environmentally-relevant requirements with regard to recovery, reuse and disposal of operating materials and components in accordance with the valid standards must be observed.

1.2 Regulations and safety notes!

- Adjustment work inside the device may only be carried out by an approved installer.
- The heat pump manager may only be operated in dry rooms with temperatures between 0 °C and 35 °C. Condensation is not permitted.
- In order to guarantee the frost protection function of the heat pump, the heat pump manager must not be deenergised and the heat pump must have flow through.

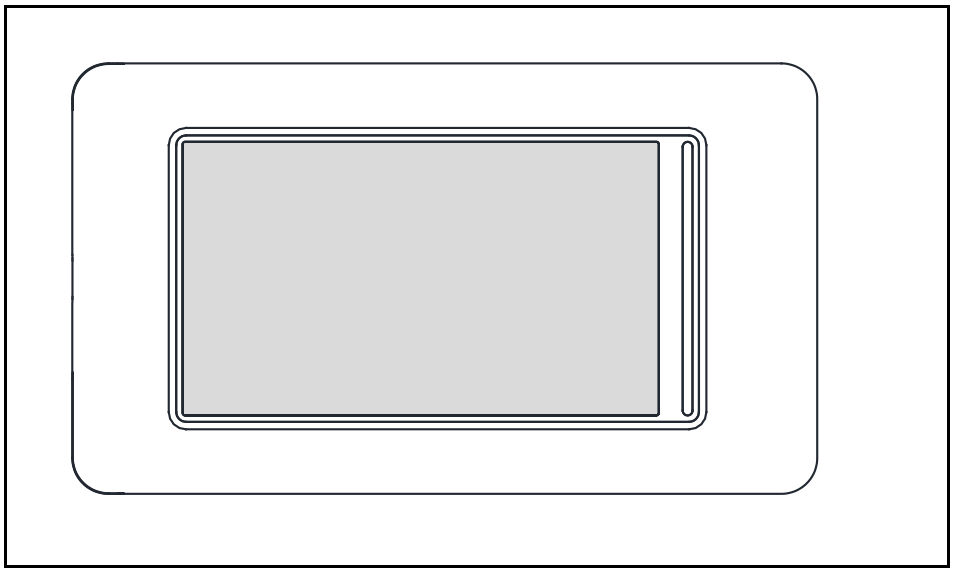
1.3 Symbols

 DANGER	Immediate danger with high risk. Failure to observe will result in severe injury or death.
 WARNING	Danger with moderate risk. Failure to observe can result in environmental damage, severe injury or death.
 CAUTION	Danger with low risk. Failure to observe can result in material damage or minor to moderate injury.
	Important note

2 Operation

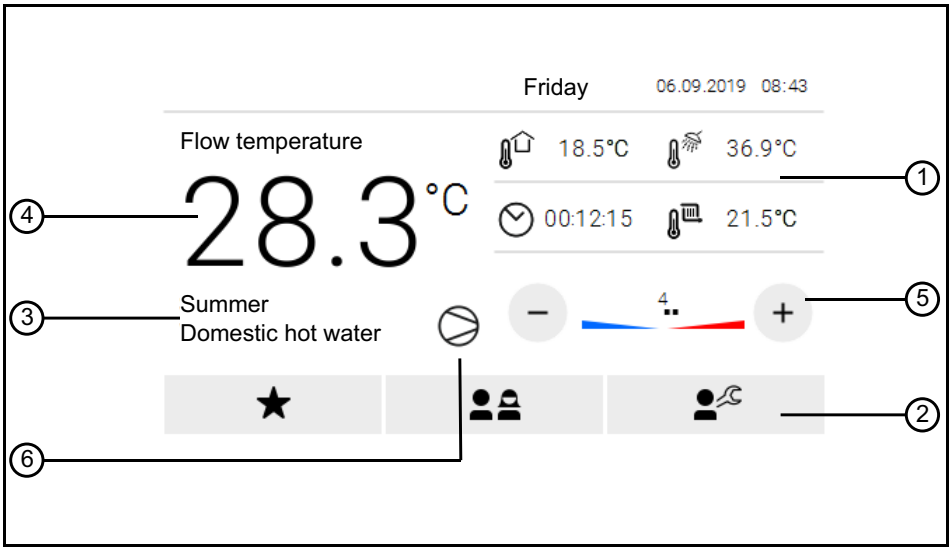
The heat pump manager is essential for the function of air-, brine- and water-to-water heat pumps. It controls a bivalent, monovalent or monoenergy heat pump heating system and monitors the safety units of the refrigeration circuit. Depending on the heat pump type, the heat pump manager is installed in the heat pump casing or is delivered as a wall-mounted controller with the heat pump and is responsible for controlling the heating system and the heat source system.

2.1 Display and operating unit



2.2 Display

Start screen



①	Information ▪ Outside temperature ▪ Domestic hot water temperature ▪ Elapsed time ▪ Return temperature
②	Level selection ▪ ★ Favourites level ▪ User level ▪ Expert level
③	Status and operating mode display
④	Flow temperature
⑤	Hotter/colder Heating curve shift
⑥	▪ Compressor “On” ▪ Compressor and 2nd heat generator “On” ▪ 2nd heat generator “On”

3 Favourites level

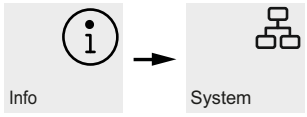
Oper. mode	Selection of the operating mode. The “Auto” operating mode can only be selected if the outside temperature-dependant operating mode switching is activated in the expert level.	**Auto** Summer Winter Party Holiday 2nd heat generator Cooling
Party	Duration of a party mode in hours. After this time has elapsed, the system switches back to the previous operating mode automatically. The value for the raise is set in the menu 1. Heat circuit - Increase times - Increase value.	0 ... **4 hours** ... 72
Holiday	Duration of a holiday mode in days. After this time has elapsed, the system switches back to the previous operating mode automatically. The value for the lower is set in the menu 1. Heat circuit - Lower times - Lower value.	0 ... **15 days** ... 150
Hot water setp. temperature	Setting the desired domestic hot water set temperature.	30 ...**50 °C** ... 85
Lower times	Setting the desired domestic hot water lower time.	
Lower time 1	Setting the domestic hot water lower times.	00:00 ... 23:59 Mon ... Sun
Lower time 2		00:00 ... 23:59 Mon ... Sun
Lower value	Setting the desired domestic hot water set temperature, which is also to be maintained during an active domestic hot water lower time.	0 ... **10 °C** ... Domestic hot water set temperature
Room setp. temperature	Setting the desired room set temperature in heating operation with room temperature control selected.	15.0 ... **20.0 °C** ... 30.0
Increase times 1.Heat circuit	Settings for increasing the heating characteristic curve heating circuit 1.	
Increase time 1	Setting of the times when an increase for heating circuit 1 should take place.	00:00 ... 23:59 Mon ... Sun
Increase time 2		00:00 ... 23:59 Mon ... Sun
Increase value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 1 should be raised during an increase.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Increase times 1.Heat circuit	Settings for setting back the heating characteristic curve heating circuit 1.	
Lower time 1	Setting of the times when a lower for heating circuit 1 should take place.	00:00 ... 23:59 Mon ... Sun
Lower time 2		00:00 ... 23:59 Mon ... Sun
Lower value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 1 should be set back during a lower time.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Increase times 2.Heat circuit	Settings for increasing the heating characteristic curve heating circuit 2.	
Increase time 1	Setting of the times when an increase for heating circuit 2 should take place.	00:00 ... 23:59 Mon ... Sun
Increase time 2		00:00 ... 23:59 Mon ... Sun

Increase value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 2 should be raised during an increase.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Increase times 2.Heat circuit	Settings for setting back the heating characteristic curve heating circuit 2.	
Lower time 1	Setting of the times when a lower for heating circuit 2 should take place.	00:00 ... 23:59 Mon ... Sun
Lower time 2		00:00 ... 23:59 Mon ... Sun
Lower value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 2 should be set back during a lower time.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Increase times 3.Heat circuit	Settings for increasing the heating characteristic curve heating circuit 3.	
Increase time 1	Setting of the times when an increase for heating circuit 3 should take place.	00:00 ... 23:59 Mon ... Sun
Increase time 2		00:00 ... 23:59 Mon ... Sun
Increase value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 3 should be raised during an increase.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Increase times 3.Heat circuit	Settings for setting back the heating characteristic curve heating circuit 3.	
Lower time 1	Setting of the times when a lower for heating circuit 3 should take place.	00:00 ... 23:59 Mon ... Sun
Lower time 2		00:00 ... 23:59 Mon ... Sun
Lower value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 3 should be set back during a lower time.	0 ... **2 K** ... 19 0 ... **2 K** ... 5

4 User level

4.1 Information

4.1.1 System

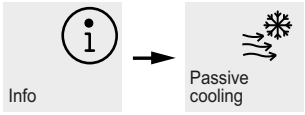


Information		Description
	External temperature	The outside temperature is used, among other things, for calculating the return set temperature, for frost protection functions and for defrosting.
	Heating/cooling demand	Shows whether and from which heating/cooling circuit there is a heating/cooling requirement. Even if there is a requirement, the heat pump may not be running (e.g. down times, scavenging times). This block is indicated with the lock symbol.
	Heating/cooling setp. temperature	Display of the calculated return set temperature for heating/cooling.
	Heating/cooling act. temperature	Display of the measured return temperature for heating/cooling
	Storage temperature renewable	Display of the measured temperature in the renewable cylinder.

4.1.2 Heating/cooling circuit 1/2/3

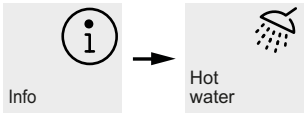
Information		Description
	Status	Shows whether there is an active heating/cooling requirement. Even if there is a requirement, the heat pump may not be running (e.g. down times, scavenging times). This block is indicated with the lock symbol.
	Mixer	If a mixer is used, the last and current status is indicated by a symbol (open, closed, open, close).
	Setp. temperature	Display of the calculated setpoint temperature for heating/cooling circuit 1/2/3.
	Act. temperature	Display of the measured actual temperature for heating/cooling circuit 1/2/3.
	Dewpoint	Display of the calculated dew point temperature without dew point distance.
	Room humidity	Display of the measured humidity when using a room climate station or RTM Econ.
	Room setp. temperature	Display of the room set temperature.
	Room temperature	Display of the measured room temperature when using a room climate station, RTM Econ or room temperature sensor.

4.1.3 Cooling



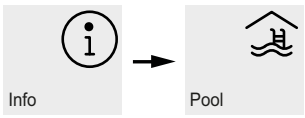
Information		Description
	Flow temperature	Display of the measured flow temperature on the passive cooling station during cooling operation.
	Return temperature	Display of the measured return temperature on the passive cooling station during cooling operation.

4.1.4 Domestic hot water



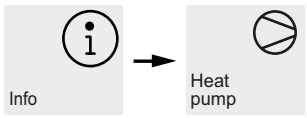
Information		Description
	Demand	Shows whether there is an active domestic hot water request. Even if there is a requirement, the heat pump may not be running (e.g. programmed shut-off time, operating limits, heat up). This block is indicated with the lock symbol.
	Setp. temperature	Display of the current domestic hot water set temperature.
	Act. temperature	Display of the measured domestic hot water temperature.

4.1.5 Pool



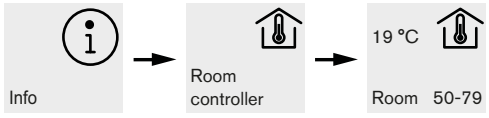
Information		Description
	Demand	Shows whether there is an active swimming pool request. Even if there is a requirement, the heat pump may not be running (e.g. programmed shut-off time, operating limits, heat up). This block is indicated with the lock symbol.
	Setp. temperature	Display of the current swimming pool set temperature.
	Temperature	Display of the current swimming pool temperature.

4.1.6 Heat pump



Information		Description
	Status	Shows the current status of the heat pump. Off, Heating, Hot water, Pool, Cooling, Defrost, Throughput monitoring, Operating mode change-over, Block
	Flow temperature	Display of the measured flow temperature. This temperature is used for the frost protection functions, operating limits and for air-to-water heat pumps as a safeguard for defrosting.
	Return temperature	Display of the measured return temperature
	Heat source inlet	Display of the heat source inlet temperature on brine and water-to-water heat pumps.
	Heat source outlet	Display of the heat source outlet temperature on brine and water-to-water heat pumps.

4.1.7 Room controller

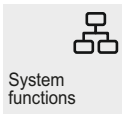


Information		Description
	room temperature	Display of the measured room temperature when using the RTM Econ room controller or the room temperature of the BMS interface (KNX, Modbus TCP, Modbus RTU).
	room humidity	Display of the measured room humidity when using the RTM Econ room controller or the room humidity of the BMS interface (KNX, Modbus TCP, Modbus RTU).
	Room set temp.	Display of the room set temperature when using the RTM Econ room controller or the room set temperature of the BMS interface (KNX, Modbus TCP, Modbus RTU).
	valve	Display of the valve setting of the RTM Econ room controller specified by the heat pump manager.

The display of the symbols for the room controller control valves is dependent on the operating mode and the control valve used.

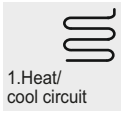
Information		Description		
Operating mode	room temperature	Type of control valve		
		Symbol	NE	NC
			Contact	Contact
Heating	too hot		open	Closed
	too cold		Closed	open
Cooling	too cold		open	Closed
	too hot		Closed	open

4.2 System functions



Setting		Description	Setting range
	Oper. mode	Selection of the operating mode. The “Auto” operating mode can only be selected if the outside temperature-dependant operating mode switching is activated in the expert level.	**Auto** Summer Winter Party Holiday 2nd heat generator Cooling
	Party	Duration of a party mode in hours. After this time has elapsed, the system switches back to the previous operating mode automatically. The value for the raise is set in the menu 1. Heat circuit - Increase times - Increase value.	0 ... **4 hours** ... 72
	Holiday	Duration of a holiday mode in days. After this time has elapsed, the system switches back to the previous operating mode automatically. The value for the lower is set in the menu 1. Heat circuit - Lower times - Lower value.	0 ... **15 days** ... 150

4.3 Heating/cooling circuit 1



During commissioning, the heating characteristic curve is adapted according to the local and structural conditions. This heating characteristic curve can be adjusted to the individual temperatures requirements with the hotter / colder arrow keys in the main display.

The plus key is used to increase the temperature, the bar display moves to the right.

The minus key is used to reduce the temperature, the bar display moves to the left.

For heating circuit 2/3, this setting takes place in the menu “2./3. Heat circuit”.

The set heating characteristic curves can be lowered or raised on a time-controlled basis. E.g. the heating characteristic curve can be lowered at night in poorly insulated buildings or excessive cooling of the heating surfaces can be prevented by raising heating characteristic curve before the shut-off time.

If the raise and lower overlap, the raise function has priority.

TIP

For energy efficient operation of the heat pump heating system, the temperature level to be achieved by the heat pump should be as low as possible.
In well-insulated buildings, an even heating operation without lower times usually results in lower energy costs, as power leaks with high flow temperatures are avoided and the same level of comfort is achieved with lower temperatures.
Shut-off times can be compensated for with a raise - which commences approx. 1 hour before the shut-off time.

Setting	Description	Setting range
Room setp. temperature	Setting the desired room set temperature in heating operation with room temperature control selected.	15.0 ... **20.0 °C** ... 30.0
Lower times	Settings for setting back the heating characteristic curve heating circuit 1.	
Lower time 1	Setting of the times when a lower for heating circuit 1 should take place.	00:00 ... 23:59 Mon ... Sun
Lower time 2		00:00 ... 23:59 Mon ... Sun
Lower value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 1 should be set back during a lower time.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Increase times	Settings for increasing the heating characteristic curve heating circuit 1.	
Increase time 1	Setting of the times when an increase for heating circuit 1 should take place.	00:00 ... 23:59 Mon ... Sun
Increase time 2		00:00 ... 23:59 Mon ... Sun
Increase value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 1 should be raised during an increase.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Silent cooling	Setting the room set temperature with silent cooling The actual value is measured on the room climate station 1.	15.0 ... **20 °C** ... 30.0
Dynamic cooling	Setting the desired return set temperature with dynamic cooling selected. The return set value is adapted on a linear basis depending on the outside temperature. A characteristic curve is used for this, which is set at two specific operating points. The return set value is defined with the fixed outside temperatures of 15 °C and 35 °C.	
Blocking time 1		10 ... **15 °C** ... 30
Blocking time 2		10 ... **15 °C** ... 30

4.4 Heating/cooling circuit 2/3

2./3.Heat/
cool circuit

Setting	Description	Setting range
Lower times	Settings for setting back the heating characteristic curve heating circuit 2/3.	
Lower time 1	Setting of the times when a lower for heating circuit 2/3 should take place.	00:00 ... 23:59 Mon ... Sun
Lower time 2		00:00 ... 23:59 Mon ... Sun
Lower value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 2/3 should be set back during a lower time.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Increase times	Settings for increasing the heating characteristic curve heating circuit 2/3	

Setting	Description	Setting range
Increase time 1	Setting of the times when an increase for heating circuit 2/3 should take place.	00:00 ... 23:59 Mon ... Sun
Increase time 2		00:00 ... 23:59 Mon ... Sun
Increase value	Setting of the difference value by which the heating characteristic curve or room temperature heating circuit 2/3 should be raised during an increase.	0 ... **2 K** ... 19 0 ... **2 K** ... 5
Silent cooling	Setting the room set temperature with silent cooling The actual value is measured on the room climate station 1/2.	15.0 ... **20.0 °C** ... 30.0

4.5 Domestic hot water

Hot water

The heat pump manager determines the maximum possible domestic hot water temperature in heat pump operation automatically. The desired domestic hot water temperature can be set in the menu “Hot water - Hot water setp. temperature”.

TIP

Because the domestic hot water preparation takes place with high flow temperatures, which can result in high energy costs, it is advisable to adapt the domestic hot water preparation to the user behaviour. This can be achieved with domestic hot water set temperatures optimally adapted to the requirements, with corresponding domestic hot water lower times and a large hysteresis.

Domestic hot water temperature HP maximum

In order to achieve the highest possible heat pump proportion for domestic hot water preparation, the heat pump manager automatically determines the maximum achievable domestic hot water temperature in heat pump operation depending on the current heat source temperature. The lower the heat source temperature (e.g. outside temperature, brine temperature), the higher the achievable domestic hot water temperature.

Domestic hot water preparation without flange heater

If the domestic hot water set temperature is higher than the maximum domestic hot water temperature that can be achieved by the heat pump, the domestic hot water preparation is interrupted as soon as “HP maximum temperature” is reached.

Domestic hot water preparation with flange heater

If the domestic hot water set temperature is higher than the maximum domestic hot water temperature that can be achieved by the heat pump, the domestic hot water preparation takes place via the installed flange heater from the “HP maximum temperature”.

Reheating with flange heater
After domestic hot water preparation with the heat pump, reheating for higher temperatures can take place with systems with a flange heater. The next domestic hot water heating only takes place once the temperature drops below the HP maximum temperature so that the basic heating can take place via the heat pump.

Domestic hot water lower times

Block times for the hot water heating can be programmed in the “Hot water lower times” menu item. During this time, the hot water heating is only carried out with minimal temperature.

If a sufficiently large storage system is available, it is advisable to switch the hot water heating or reheating to overnight in order to use the low-tariff periods that are often cheaper.

Thermal disinfection

In the menu item “Hot water - Thermal disinfection”, on bivalent systems or with domestic hot water cylinders with installed flange heater, thermal disinfection can take place with domestic hot water temperatures of up to 85 °C. The thermal disinfection can take place at a start time that can be set for each weekday.

Circulation

In the menu item “Hot water - Circulation”, the actuation of the circulation pump can be programmed. A maximum of two time windows can be defined. A maximum of two circulation times can be assigned to each weekday. Exceeding demands are activated or deactivated at midnight.

TIP

A circulation line uses large amounts of energy. To save on energy costs, circulation should not be used. If this is unavoidable, it is advisable to adapt the time window to the optimal conditions. A better approach is to have the circulation running via an impulse for a specific time. This function is also possible with the heat pump manager.

Setting	Description	Setting range
Hot water setp. temperature	Setting the desired domestic hot water set temperature.	30 ... **50 °C** ... 85
Hot water lower times	Setting the desired domestic hot water lower time.	
Lower time 1	Setting the domestic hot water lower times.	00:00 ... 23:59 Mon ... Sun
Lower time 2		00:00 ... 23:59 Mon ... Sun
Lower temperature	Setting the desired domestic hot water set temperature, which is also to be maintained during an active domestic hot water lower time.	0 ... **10 °C** ... Domestic hot water set temperature
Thermal disinfection	Thermal disinfection results in a one-off domestic hot water heating up to the desired temperature. The status is ended automatically when thetemperature is reached, at 24:00 or at the latest after 4 hours.	
Start time	Setting the start time for thermal disinfection.	00:00 ... 23:59
Temperature	Setting the desired domestic hot water set temperature to be achieved with thermal disinfection.	**60 °C** ... 85
Circulation	The circulation pump is actuated by a time function or an impulse input.	
Time program 1	Setting the circulation pump actuation times.	00:00 ... 23:59 Mon ... Sun
Time program 2		00:00 ... 23:59 Mon ... Sun
Impulse time	Setting the runtime of the circulation pump with activation after an impulse.	1 ... **5 minutes** ... 15

4.6 Pool

Setting		Description	Setting range
	Setp. temperature	Setting the desired swimming pool set temperature.	5 ... **25 °C** ... 60
	Blocking time	Setting the time programs for blocking the swimming pool preparation.	
	Blocking time 1	Setting the times for a swimming pool block.	00:00 ... 23:59 Mon ... Sun
	Blocking time 2		00:00 ... 23:59 Mon ... Sun
	Temperature	Setting the desired swimming pool set temperature, which is also to be maintained during an active swimming pool block.	0 ... **10 °C** ... Pool set temperature
	Priority	Setting the time programs for prioritising the swimming pool preparation.	
	Start time	Setting the start time for swimming pool priority.	00:00 ... 23:59 Mon ... Sun
	Priority hours	Setting the desired number of hours for swimming pool priority.	1 ...**1 hours** ... 10

4.7 Statistic

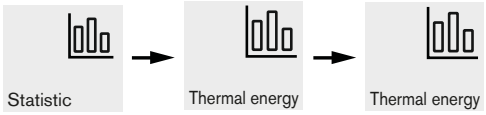
Setting		Description
	Compressor 1	Runtime compressor 1 The runtime can be reset.
	Compressor 1 total	The total runtime can not be reset.
	Compressor 2	Runtime compressor 2 The runtime can be reset.
	Compressor 2 total	The total runtime can not be reset.
	Fan	Fan runtime The runtime is lower than the sum of the compressor runtimes due to defrosting. The runtime can be reset.
	Fan total	The total runtime can not be reset.
	Primary pump	Runtime of the primary pump or the well pump The runtime is higher than the sum of the compressor runtimes due to pump flow and pump delay. The runtime can be reset.
	Primary pump total	The total runtime can not be reset.
	2.heat generator	Runtime 2nd heat generator The runtime can be reset.

Setting		Description
	2.heat generator total	The total runtime can not be reset.
	Heating pump	Runtime heat circulating pump The runtime can be reset.
	Heating pump total	The total runtime can not be reset.
	Add. pump	Runtime auxiliary circulating pump The runtime can be reset.
	Add. pump total	The total runtime can not be reset.
	Hot water pump	Runtime domestic hot water circulating pump The runtime can be reset.
	Hot water pump total	The total runtime can not be reset.
	Flange heating	Runtime flange heater The runtime can be reset.
	Flange heating total	The total runtime can not be reset.
	Pool pump	Runtime swimming pool circulating pump The runtime can be reset.
	Pool pump total	The total runtime can not be reset.
	Renewable	Runtime renewable The runtime can be reset.
	Renewable total	The total runtime can not be reset.
	Cooling	Runtime of the compressor in cooling operation The runtime can be reset.
	Cooling total	The total runtime can not be reset.

4.8 Thermal energy, energy and efficiency

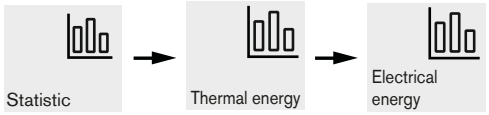
The recording of the quantities of thermal energy and efficiencies takes place based on process data of the heat pump. The deviations between the displayed and actual electrical and thermal energy can be considerable. The information is not suitable for energy billing and serves only as comparison values for past heating periods. The provision of the values depends on the heat pump type.

4.8.1 Quantity of thermal energy



Information		Description
	heat pump	The quantity of thermal energy emitted from the heat pump is added up and displayed. The quantity of thermal energy can be reset.
	heat pump total	The total thermal energy cannot be reset.
	heating	The quantity of thermal energy supplied by the heat pump in heating operating mode is displayed here. For parallel operation (with additional heat exchanger: DHW and heating), the quantity of thermal energy is included in the calculation here. The quantity of thermal energy can be reset. The quantity of thermal energy for heating can be reset.
	heating total	The total thermal energy for heating cannot be reset.
	hot water	The quantity of thermal energy supplied by the heat pump during domestic hot water operating mode is displayed here. The quantity of thermal energy can be reset. The quantity of thermal energy for domestic hot water can be reset.
	hot water total	The total thermal energy for heating cannot be reset.
	swimming pool	The quantity of thermal energy supplied by the heat pump during swimming pool operating mode is displayed here. The quantity of thermal energy can be reset. The quantity of thermal energy for the swimming pool can be reset.
	swimming pool total	The total thermal energy for the swimming pool cannot be reset.
	ambient energy	Display of the environmental energy used The ambient energy can be reset.
	ambient energy total	The total ambient energy cannot be reset.

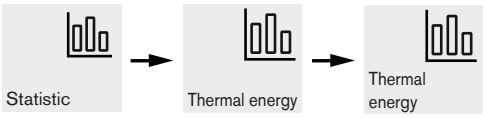
4.8.2 Electrical energy



Display of the total electrical energy for the compressor, immersion heater, flange heater, pipe heater and the power share for the fan, brine or well pump.

Information		Description	Display range
	day	Display of the past 11 day values and the current day value since 0:00.	0 ... 32000 kWh
	week	Display of the past 11 week values and the current week value since Monday 0:00.	0 ... 32000 kWh
	month	Display of the past 35 month values and the current month.	0 ... 28000 kWh 28 ... 327.68 MWh
	year	Display of the past 11 year values and the current year.	0 ... 28000 kWh 28 ... 3276.8 MWh

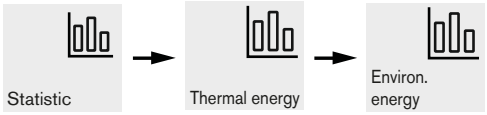
4.8.3 Thermal energy



Display of the provided thermal energy from the compressor, immersion heater, flange heater and pipe heater. External components, such as heat circulating pumps and bivalent or renewable heat generators, are not taken into account.

Information		Description	Display range
	day	Display of the past 11 day values and the current day value since 0:00.	0 ... 32000 kWh
	week	Display of the past 11 week values and the current week value since Monday 0:00.	0 ... 32000 kWh
	month	Display of the past 35 month values and the current month.	0 ... 28000 kWh 28 ... 327.68 MWh
	year	Display of the past 11 year values and the current year.	0 ... 28000 kWh 28 ... 3276.8 MWh

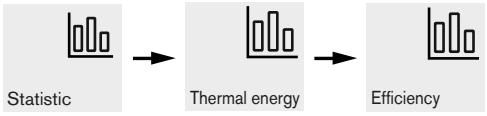
4.8.4 Environmental energy



The environmental energy is the energy provided by the environment (air, ground, water).

Information		Description	Display range
	day	Display of the past 11 day values and the current day value since 0:00.	0 ... 32000 kWh
	week	Display of the past 11 week values and the current week value since Monday 0:00.	0 ... 32000 kWh
	month	Display of the past 35 month values and the current month.	0 ... 28000 kWh 28 ... 327.68 MWh
	year	Display of the past 11 year values and the current year.	0 ... 28000 kWh 28 ... 3276.8 MWh

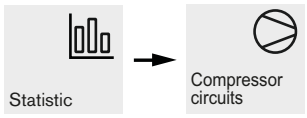
4.8.5 Efficiency



The efficiency is a result of the thermal and electrical energy and reflects the quality of the overall system.

Information		Description	Display range
	month	Display of the past 35 month values and the current month.	0 ... ∞
	year	Display of the past 11 year values and the current year.	0 ... ∞

4.9 Compressor circuits



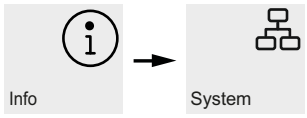
Setting		Description
	Compressor 1 total	Display of the switchings compressor 1 total.
	Compressor 1 Heating	Display of the switchings compressor 1 in heating operation.
	Compressor 1 Hot water	Display of the switchings compressor 1 during domestic hot water preparation.
	Compressor 1 Pool	Display of the switchings compressor 1 in swimming pool preparation.
	Compressor 1 Cooling	Display of the switchings compressor 1 in cooling operation.
	Compressor 2 total	Display of the switchings compressor 2 total.
	Compressor 2 Heating	Display of the switchings compressor 2 in heating operation.
	Compressor 2 Hot water	Display of the switchings compressor 2 during domestic hot water preparation.
	Compressor 2 Pool	Display of the switchings compressor 2 in swimming pool preparation.
	Compressor 2 Cooling	Display of the switchings compressor 2 in cooling operation.

4.10 Settings

Parameters	Setting		Setting range
 Language	Setting the desired language. Depending on the software version, not all languages listed may be available.		Deutsch English Français Nederlands Italiano Svenska Dansk Magyar Český Slovenský Hrvatski Slovenski Norsk
 Time	Setting of the time.		00:00 ... 23:59
 Date	Setting of the day, month, year and weekday.		04.02.19 Mon ... Sun
 Time change	Automatic switching between summer and winter time can be selected.		Yes / No
 Network	Protocol	The Protocol setting is used to define the type of interface installed and the transmission protocol.	**LAN** Modbus RTU EIB / KNX Modbus TCP
	Address	When Modbus is used, every terminal device in the network must be assigned an address. This address is used to communicate with the desired terminal device.	000 ... **001** ... 199
	Baud rate	When Modbus is used, the baud rate must be adapted to the system baud rate. It is important to ensure that the same baud rate is set on both sides of the communication.	1200 2400 4800 9600 **19200**
	Parity	If Modbus is selected, the parity can be selected here.	**None** Even Odd
	Stop bits	If Modbus is selected, the stop bits can be selected here.	1 **2**
 NWPM Settings	IP address Netmask Gateway DNS1 DNS2	Reading out the IP address Reading out the subnet mask Reading out the gateway address Reading out the DNS1 address Reading out the DNS2 address	000 ... 255 000 ... 255 000 ... 255 000 ... 255 000 ... 255
 Display	Brightness Light strip Reboot	Setting the display brightness Setting whether the light strip should be “Permanent On” and therefore lights up green or “Permanent Off”. The display can be restarted manually, without disconnecting the power supply to the heat pump completely.	0 ... 255 On / Off Yes

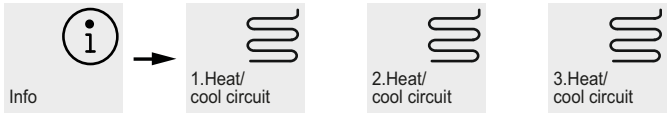
5 Expert level

5.1 System



Parameters	Description
1.1.1 External temperature	The outside temperature is used, among other things, for calculating the return set temperature, for frost protection functions and for defrosting.
1.1.2 Heat circuit	Shows whether and from which heating circuit there is a heating request. Even if there is a requirement, the heat pump may not be running (e.g. down times, scavenging times). This block is indicated with the lock symbol.
1.1.3 Cool circuit	Shows whether and from which heating/cooling circuit there is a cooling requirement. Even if there is a requirement, the heat pump may not be running (e.g. down times, scavenging times). This block is indicated with the lock symbol.
1.1.4 Heating return setp. temperature	Display of the calculated return set temperature in heating operation.
1.1.5 Heating return temperature	Display of the measured return temperature in heating operation.
1.1.6 Cooling return setp. temperature	Display of the calculated return set temperature in cooling operation.
1.1.7 Cooling return temperature	Display of the measured return temperature in cooling operation.
1.1.8 Storage temperature Renewable	Display of the measured temperature in the renewable cylinder.

5.2 Heating/cooling circuit 1/2/3



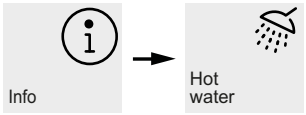
Parameters	Description
1.2.1/1.3.1/1.4.1 Heating/Cooling	Shows the current operating mode of the relevant circuit. If the circuit is blocked for an operating mode, this is indicated by a lock symbol. A mixer symbol indicates the current status of the mixer.
1.2.2/1.3.2/1.4.2 Setp. temperature	Display of the calculated setpoint temperature for heating/cooling circuit 1/2/3.
1.2.3/1.3.3/1.4.3 Act. temperature	Display of the measured actual temperature for heating/cooling circuit 1/2/3.
1.2.4/1.3.4/1.4.4 Dewpoint	Display of the calculated dew point temperature without dew point distance when using room controller RTM Econ.
1.2.5/1.3.5/1.4.5 Dewpoint	Display of the calculated dew point temperature without dew point distance when using a room climate station.

Parameters	Description
1.2.6/1.3.6/1.4.6 Room humidity	Display of the measured humidity when using a room climate station or RTM Econ.
1.2.7/1.3.7/1.4.7 Room setp. temperature	Display of the room set temperature.
1.2.8/1.3.8/1.4.8 Room temperature	Display of the measured room temperature when using a room climate station, RTM Econ or room temperature sensor.

5.3 Passive cooling

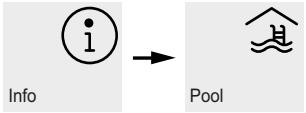
Parameters	Description
1.5.1 Flow temperature	Display of the measured flow temperature on the passive cooling station during cooling operation.
1.5.2 Return temperature	Display of the measured return temperature on the passive cooling station during cooling operation.

5.4 Domestic hot water



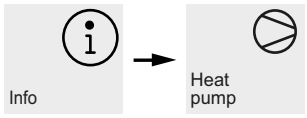
Parameters	Description
1.6.1 Demand	Shows whether there is an active domestic hot water request. Even if there is a requirement, the heat pump may not be running (e.g. programmed shut-off time, operating limits, heat up). This block is indicated with the lock symbol.
1.6.2 Setp. temperature	Display of the current domestic hot water set temperature.
1.6.3 Act. temperature	Display of the measured domestic hot water temperature.

5.5 Pool



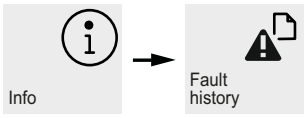
Parameters	Description
1.7.1 Demand	Shows whether there is an active swimming pool request. Even if there is a requirement, the heat pump may not be running (e.g. programmed shut-off time, operating limits, heat up). This block is indicated with the lock symbol.
1.7.2 Setp. temperature	Display of the current swimming pool set temperature.
1.7.3 Act. temperature	Display of the current swimming pool temperature.

5.6 Heat pump



Parameters	Description
1.8.1 Status	Shows the current status of the heat pump. Off, Heating, Hot water, Pool, Cooling, Defrost, Throughput monitoring, Operating mode change-over, Block
1.8.2 Return temperature	Display of the measured return temperature
1.8.3 Flow temperature	Display of the measured flow temperature. This temperature is used for the frost protection functions, operating limits and for air-to-water heat pumps as a safeguard for defrosting.
1.8.4 Heat source inlet temperature	Display of the heat source inlet temperature on brine and water-to-water heat pumps.
1.8.5 Heat source outlet temperature	Display of the heat source outlet temperature on brine and water-to-water heat pumps.
1.8.6 Brine temperature	Display of the measured shared brine temperature with reversible brine-to-water heat pumps with active/passive combination (R24).
1.8.7 High pressure sensor	Display of the measured high pressure value.
1.8.8 Low pressure sensor	Display of the measured low pressure value.
1.8.9 Load stage Heating	Display of the calculated load stage for heating.
1.8.10 Load stage Cooling	Display of the calculated load stage for cooling.

5.7 Error history



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

The heat pump manager displays the active faults in plain text. The heat pump is blocked. Once the fault has been remedied, the heat pump can be commissioned again by actuating the 6 key. (Switching off the control voltage also acknowledges an active fault.)

With mono energy systems, switching to the operating mode 2nd heat generator enables the heating to be taken over the by the immersion heater and the domestic hot water preparation by the flange heater.

Low pressure switch brine

If a “low pressure switch brine” available as a special accessory is installed in the primary circuit of a brine-to-water heat pump, a fault is triggered if there is a drop in brine pressure.

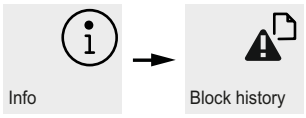
Diagnosis faults - alarm - block

The menu “Info - Error history/Block history” documents the last 10 causes for a fault and block. The documentation takes place with date, time, heat source temperature, flow temperature, return temperature andthe status message.

Error code	Error	Message	Measure
F1	Expansion N17.1	The expansion module “Cooling general” is not recognised	• Connection cable check - Cable interrupted - Connector loose - Individual wires mixed up Power supply check
F2	Expansion N17.2	The expansion module “Cooling active” is not recognised.	
F3	Expansion N17.3	The expansion module “Cooling passive” is not recognised.	
F5	Expansion N17	The expansion module “Cooling” is not recognised.	
F6	Electronic expansion valve	The electronic expansion valve is not recognised.	
F7	Room controller RTH Econ	The reference room modulator is not recognised.	
F8	Expansion ODU	The refrigeration circuit controller is not recognised	
F10	Expansion WPIO		
F12	Error inverter	The inverter reports an error. There is a wide range of possible causes.	• Inform after-sales service
F15	Sensor technology	An error has occurred on the required sensor technology, the exact cause is shown in the plain text.	• Connection cable check - Cable interrupted - Connector loose - Individual wires mixed up Power supply check
F16	Brine pressure switch	The brine pressure switch in the brine circuit has switched.	• Check the brine pressure
F19	Primary circuit	Fault due to motor protection primary pump or fan	• Motor protection primary pump or fan • Check the setting or function

Error code	Error	Message	Measure
F20	Defrost	Defrosting of the air-to-water heat pump could not be initiated or could not be ended correctly. There is a wide range of possible causes for this message.	• Check the heating water flow rate • Check the heating water pressure • Check the flow and return temperature • Inform after-sales service
F21	Brine pressure switch	The brine pressure switch in the brine circuit has switched.	• Check the brine pressure
F22	Domestic hot water	Domestic hot water temperatures in heat pump operation under 35 °C	• Throughput of the domestic hot water circulating pump too low • Check valve heating faulty • Check the domestic hot water sensor
F23	Load compressor	Direction of rotation incorrect Phase failure Start-up current of the compressor too high Undervoltage operating current of compressor too high Overtemperature soft starter Mains frequency incorrect	• Check the rotary field • Check the supply voltage • Inform after-sales service
F24	Coding	Coding does not match the heat pump type	• The detected heat pump type is shown in the Version overview menu
F25	Low pressure	The heat source supplies too little energy	• Clean the filter in the dirt trap • Purge the heat source system • Check the brine or water flow • Inform after-sales service • Evaporator iced over or system temperatures too low (return < 18 °C)
F26	Frost protection	The flow temperature in heating operating mode is below 7 °C.	• Increase the heating water temperature
F28	High pressure	The heat pump was switched off by the high pressure sensor or pressure switch.	• Lower the heating curve setting • Raise the heating water flow rate • Check the overflow valve
F29	Temperature difference	The temperature difference between the flow and return for defrosting is too large (>12 K) or negative.	• Check the heating water flow rate • Check the overflow valve and pump size • Flow and return mixed up
F30	Hot gas thermostat		• Inform after-sales service
F31	Throughput	The heat pump was switched off due to a lack of flow in the primary or secondary circuit.	• Water flow well or brine circuit too low • Water flow in the secondary circuit too low • Flow direction incorrect

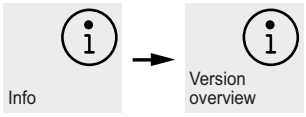
5.8 Block history



Block code	Block	Brief description
S5	Function check	The check function has been activated by a user.
S7	System check	The system check was activated by a user for approx. 24 hours.
S8	Delay Operating mode change-over	The delay time protects the heat pump from a quick temperature change with a cooling and domestic hot water demand.
S9	Pump supply	The heat pump starts after the set pump flow has elapsed
S10	Minimum pause time	The heat pump starts after the minimum pause time has elapsed in order to fulfil a pending demand. The minimum pause time protects the heat pump and can last for up to 5 minutes.
S11	Line load	The heat pump starts after the line switch-on load in order to fulfil a pending demand. The line switch-on load is a requirement from the utility companies and can last for up to 200 seconds after the voltage is restored or utility blocks.
S12	Switch cycle block	The heat pump starts after the switch cycle block in order to fulfil a pending demand. The switch cycle block is a requirement from the utility companies and can last for up to 20 minutes.
S13	Domestic hot water reheating	The domestic hot water reheating via the flange or pipe heating is active
S14	Renewable	If “bivalent-renewable” operating mode is selected, the temperature in the cylinder is high enough to process the active demand.
S15	Utility block	There is an active utility block.
S16	Soft starter	Switch-off of the heat pump due to soft starter
S17	Throughput	The heat pump was switched off due to a lack of flow in the primary or secondary circuit. The message is reset automatically 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 permissible high-pressure values for the heat pump have been exceeded.
S20	Low pressure	The permissible low-pressure values for the heat pump have not been reached.
S21	Operating limit	The heat source temperature is below the operating limit for the heat pump.
S22	4-way valve	The 4-way valve has not switched back to the initial state after defrosting.
S23	System limit	The system temperatures are too low to operate the heat pump.
S24	Primary circuit load	The heat pump was blocked due to the fan motor protection. The heat pump restarts automatically.
S25	External block	The system was switched to blocked state by an external blocking signal on input ID4. The function can be configured in the menu.
S26	WPIO	The communication between the heat pump manager and refrigeration circuit controller WPIO is interrupted. If no connection can be established, a fault is triggered.
S29	Inverter	The inverter was blocked. There is a wide range of possible causes. An attempt is made to remove the block automatically.
S30	Maximum blocks	The maximum number of daily approved blocks has been exceeded. The block will be lifted automatically after 00:00.
S31	Heat	The "Heat" function is intended to prevent an excessive concentration of liquid refrigerant in the oil when the compressor starts up. The maximum heat time can be up to 9 hours!

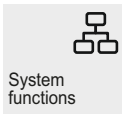
Block code	Block	Brief description
S32	Maximum operating mode switching	The number of permitted daily operating mode switchings has been exceeded. The block will be lifted automatically after 00:00.
S33	EvD initialisation	The communication with the electronic expansion valve is established
S34	2nd heat generator	The operating mode 2nd heat generator has been selected. The heat pump is switched off. The heat generation takes place exclusively via the 2nd heat generator

5.9 Version overview



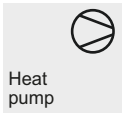
Parameters	Description
1.9.1 Heat pump type	Display of the heat pump type.
1.9.2 Heat pump code	Display of the heat pump code.
1.9.3 WPM Software	Display of the heat pump manager software version.
1.9.4 WPM BIOS	Display of the heat pump manager BIOS version.
1.9.5 WPM BOOT	Display of the heat pump manager BOOT version.
1.9.6 WPM Hardware	Display of the heat pump manager hardware version.
1.9.7 IO Software	IO is an additional extension. If an IO extension is present, the software version is shown here.
1.9.8 IO BIOS	Display of the IO extension BIOS version.
1.9.9 IO BOOT	Display of the IO extension BOOT version.
1.9.10 IO Hardware	Display of the IO extension hardware version.
1.9.11 pGD Software	Display of the pGDx display software version.
1.9.12 pGD Run Time	Display of the pGDx display run time version.
1.9.13 pGD Main OS	Display of the pGDx display main OS version.

5.10 System function



Parameters	Setting	Setting range
2.1 Automatic oper. mode change-over	Setting whether operating mode switching should take place automatically.	Yes / No
2.2 Oper. mode change-over	If the outside temperature-dependent operating mode switching is activated, the operating mode is changed automatically depending on an adjustable limit temperature. A change takes place if the limit temperatures are exceeded or not reached in a row for the set time.	**1 h** …150
2.3 External temperature Heating < 2.4 External temperature Cooling >	Limit temperatures at which the operating mode of the heat pump is switched automatically. The summer operating mode is active between the limit temperatures.	-30 … **15 °C** … 40 -30 … **25 °C** … 40

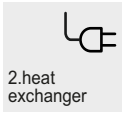
5.11 Heat pump



Parameters	Setting	Setting range
3.1 Compressor qty.	The setting for the number of compressors is dependent on the heat pump type, the relevant quantity can be found in the operating the installation instructions for the heat pump or the heat pump type plate.	**1** / 2
3.2 Fan lower times	Settings for lowering the fan speed. The lowering results in an output reduction by approx. 15%.	
3.2.1 Lower time 1 3.2.2 Lower time 2	Setting the times for lowering the fan speed. It can be selected separately for each weekday whether lower time 1 and/or lower time 2 for the fan speed should be activated. Lowers extending beyond a weekday are activated or deactivated at midnight.	**00:00** ... 23:59 MON ...SUN
3.2.3 Lower value	Value for lowering the fan speed during cooling. A fixed value applies during heating.	0.0 … **1.0 V** … 1.5
3.3 Heat pump code	The 4-digit heat pump code printed on the type plate can be corrected with these settings.	
3.4 Freeze protection	Setting of the lower operating limit for using the heat source ground water or waste heat recovery via intermediate heat exchanger. Depending on the heat pump type, the usage range (brine) of the heat source can be expanded as required. In this case, the minimum brine concentration must be adapted to 30 %.	15 ... **-9 °C** … -13

Parameters	Setting	Setting range
3.5 Primary pump M11 3.6 Primary pump manual	Setting the speed of the electronically regulated primary circulating pump heat source (M11).	manual Stage 1 Stage 2 **Stage 3** automatic 20 ... **50** ... 100
3.7 Flow switch secondary circuit	Does flow rate monitoring take place in the secondary circuit?	Yes / No
3.8 Flow rate switch Primary circuit	Does flow rate monitoring take place in the primary circuit?	Yes / No

5.12 2nd heat generator



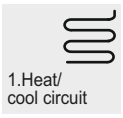
Parameters	Setting	Setting range
4.1 Limit temperature parallel	The limit temperature of the 2nd heat generator must be selected according to the design of the heat pump heating system. Below the limit temperature parallel, the heat pump runs and the 2nd heat generator for heating the building. The 2nd heat generator is only switched on from temperatures below the set limit temperature parallel and load stage 3. If parallel operation is not desired, the limit temperature parallel should be adapted to the limit temperature alternative.	*Limit temperature alternative* ... **-5 °C** … Limit temperature 2nd compressor
4.2 Limit temperature alternative	If the value falls below the limit temperature alternative and load stage 3, only the 2nd heat generator is used to heat the building. The heat pump is blocked from this time	*Lower operating limit* ... **-10 °C** … Limit temperature parallel
4.3 Operating mode	A sliding regulated 2nd heat generator has its own regulation and is flowed through with the full volume flow if necessary. A constantly regulated 2nd heat generator is set to a constant temperature, the mixer regulation is active.	**Sliding (valve)** Constant (mixer)
4.4 Mixer run time	The runtime between the end positions OPEN and CLOSED is different depending on the mixer used. To achieve an optimal temperature regulation of the bivalent heat generator, the mixer runtime must be set.	1 ... **4 minutes** … 6
4.5 Mixer hysteresis	The hysteresis of the mixer forms the neutral zone for the operation of the bivalent heat generator. If the set temperature plus hysteresis is reached, a mixer closed signal is given. If the set temperature minus hysteresis is not reached, a mixer open signal is given	0.5 …**2K**
4.6 EVU block release	This setting indicates the behaviour of the 2nd heat generator during a utility block (interruption of the supply voltage). Load stage 3: The 2nd heat generator is only released in load stage 3 during the utility block. On mono energy systems, the immersion heater is always blocked. Permanent: The 2nd heat generator is released during the utility block. Limit temp. dependent: The 2nd heat generator is released during the utility block if the limit temperature is also not reached.	**Load stage 3** Permanent Limit temp. dependent

Parameters	Setting	Setting range
4.7 EVU block limit temperature	Limit temperature for releasing the 2nd heat generator if Limit temp. dependent is set.	-10 ... **0 °C** … +10
4.8 Special program	The special program should be used for old boilers or bivalent systems with central storage systems to prevent corrosion through condensation. When the 2nd heat generator is released, it remains in operation for at least the number of hours set.	0 ... **1 hours** … 99
4.9 Mixer run time	The runtime between the end positions OPEN and CLOSED is different depending on the mixer used. To achieve an optimal temperature regulation of the bivalent-renewable heat generator, the mixer runtime must be set.	1 ... **4 minutes** … 6
4.10 Mixer hysteresis	The hysteresis of the mixer forms the neutral zone for the operation of the bivalent-renewable heat generator. If the set temperature plus hysteresis is reached, a mixer closed signal is given. If the set temperature minus hysteresis is not reached, a mixer open signal is given	0.5 …**2K**
4.11 Heating Bivalent-Renewable temperature 4.12 Heating Bivalent-Renewable	Temperature difference between the storage renewable and flow temperature, which must be exceeded for the heat pump to be blocked if a heating request is present. *Comfort:* A renewable heating block is only active if the temperature in the storage renewable is higher than the current return set temperature minus hysteresis. *Energy optimised:* A renewable heating block is independent from the return set temperature.	2 ... **10 K** ... 20 **Comfort** / Energy optimised
4.13 Hot water Bivalent-Renewable	Temperature difference between the storage renewable and domestic hot water temperature, which must be exceeded for the heat pump to be blocked if a domestic hot water request is present.	2 … **5 K** … 50
4.14 Pool Bivalent-Renewable	Temperature of the storage renewable, which must be exceeded for the heat pump to be blocked if a swimming pool request is present.	10 … **35 °C** … 50
4.15 Voltage Burner off	Target value specification of a bivalent heat generator via a 0-10V signal. Setting of the voltage for burner off.	0.2 … 2.5 V … Voltage minimum
4.16 Voltage minimum	Setting value for the minimum voltage for the minimum system temperature	Voltage burner off … 3.0 V … Voltage maximum
4.17 Voltage maximum	Setting value for the maximum voltage for the maximum system temperature	Voltage minimum … 3.0 V … Voltage maximum
4.18 System temperature minimum	Setting value for the minimum system temperature at minimum voltage.	8 °C … System temperature maximum
4.19 System temperature maximum	Setting value for the maximum system temperature at maximum voltage.	System temperature minimum … 80 °C

5.13 Heating/Cooling

Parameters	Setting	Setting range
5.1 Heating hysteresis return setp. temperature	The hysteresis of the return set temperature forms the neutral zone for the heating operation of the heat pump. If the “return set temperature plus hysteresis” is reached, the heat pump switches off. If the “return set temperature minus hysteresis” is reached, the heat pump switches on.	0.5 … **2.0 K** … 5.0
5.2 Cooling hysteresis return setp. temperature	The hysteresis of the return set temperature forms the neutral zonefor the cooling operation of the heat pump. If the “return set temperature minus hysteresis” is reached, the heat pump switches off. If the “return set temperature plus hysteresis” is reached, the heat pump switches on.	0.5 … **2.0 K** … 5.0
5.3 Cooling 2.refriger. unit	Setting for whether a 2nd refrigerator is to be used on the installation.	**No** / Yes
5.4 Cooling limit ext. temperature	Setting of the outside temperature, below which the cooling is stopped with reversible brine-to-water heat pump or passive cooling.	-20 ... **3 °C** … 35
5.5 Cool. passive hysteresis	If the current cooling return set temperature minus hysteresis passive is higher than the current brine temperature, passive cooling takes place.	0.1 … **2.0 K** … 9.9
5.6 Heating room control I-portion minimal 5.7 Heating room control I-portion maximum	Settings for control with room temperature control selected during heating I * gain factor minimum number of minutes / maximum number of minutes P * gain factor (grade rule) value after voltage is restored in % between 18 °C and 50 °C	0 … **4** … 9
5.8 Heating room control ventilation reset	Reset of the room control, detection of an open window.	**No** / Yes
5.9 Cooling room control I-portion	Setting of the I-portion with selected room temperature control during cooling	001 … **060** … 999
5.10/5.11 Heating compressor 2 limit temperature	The limit temperature of the 2nd compressor must be selected according to the design of the heat pump heating system. Below the limit temperature of the 2nd compressor, the heat pump runs with 2 compressors for heating the building. The 2nd compressor is only switched on from temperatures below the set limit temperature parallel and load stage 2.	*Limit temperature parallel* ... **+35 °C** … +99
5.12/5.13 Cooling compressor 2 limit temperature	The limit temperature of the 2nd compressor must be selected according to the design of the heat pump heating system. Below the limit temperature of the 2nd compressor, the heat pump runs with 2 compressors for heating the building. The 2nd compressor is only switched on from temperatures below the set limit temperature parallel and load stage 2.	15 ... **+15 °C** … +99

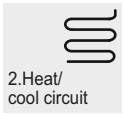
5.14 Heating/cooling circuit 1

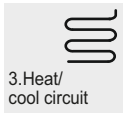


Parameters	Setting	Setting range
6.1 Heating curve end point (-20°C)	The heating curve end point must be set according to the design of the heat pump heating system. The maximum return set temperature must be entered here, which is determined based on the calculated maximum flow temperature, minus the temperature difference in the heating system (spread).	20 … **30 °C** … 70
6.2 Fixed value reg. return setp. temperature	Setting the desired return set temperature with fixed value regulation selected	*min. setp. temp.* … **40 °C** … 60
6.3 Room control Room setp. temperature	Setting the desired room set temperature and the I-portion with room temperature control selected	15.0 … **20.0 °C** … 30.0
6.5 Return temperature minimal Heating 6.6 Return temperature minimal Heating manual	Setting the minimum return set temperature for heating operation. If room control is activated, it is possible to select whether the minimum return set temperature is adapted automatically to the set room set temperature.	manual / automatic minimum … **20 °C** … 30
6.7 Return temperature maximum Heating 6.8 Return temperature maximum Heating manual 6.9 Return temperature maximum Heating automatic	For panel and radiator heating systems, different maximum temperatures are permitted. The upper limit of the return set temperature can be set between 25 °C and 70 °C.	manual / automatic minimum … **50 °C** … 70 1 ... **10 K** ... 20
6.10 Mixer hysteresis	The hysteresis of the mixer forms the neutral zone for the operation of heating/cooling circuit 1. If the set temperature plus hysteresis is reached, a mixer closed signal is given. If the set temperature minus hysteresis is not reached, a mixer open signal is given.	0.5 … **2.0 K** … 5.0
6.11 Mixer run time	The runtime between the end positions OPEN and CLOSED is different depending on the mixer used. To achieve optimal temperature regulation in heating/cooling circuit 1, the mixer runtime must be set.	1 ... **4 minutes** … 6
6.12 Room control limit temperature	Below the set limit temperature, the rooms with a lower room set temperature are not taken into account for overheating with activated Smart-Grid function.	15 … **19 °C** … 30
6.13 Room control hysteresis bottom	To prevent unnecessary cycling of the control valves, the hysteresis for opening and closing the control valves can be adapted to the room actual temperature depending on the room set temperature.	0.0 … **0.3 K** … 2.0
6.14 Room control hysteresis top		0.0 … **0.8 K** … 2.0

Parameters	Setting	Setting range
06:15 Room control flow 6.16 Room control flow manual	It is possible to select whether the flow temperature required for the mixer during room control takes place automatically via the determined spread of the system, or manually via a fixed set value.	manual / **automatic** 0 … **5 K** … 10
6.17 Silent cooling dewpoint diff.	Increase of the minimum permissible flow temperature, calculated from the measured values of room climate station 1. An increased value reduces the risk of condensate formation.	1.5 … **3.5 K** … 5.0
06:18 Heating M13 6.19 Heating M13 manual	Setting the speed for the electronically regulated circulating pump (M13) in heating operation.	manual Stage 1 Stage 2 **Stage 3** automatic 30 ... **50 %** ... 100
6.20 Cooling M13 6.21 Cooling M13 manual	Setting the speed for the electronically regulated circulating pump (M13) in cooling operation	manual Stage 1 Stage 2 **Stage 3** automatic 30 ... **50 %** ... 100

5.15 Heating/cooling circuit 2/3





Parameters	Setting	Setting range
7.1/8.1 Temperature sensor	Is the sensor for heating circuit 2/3 installed in the flow and return? When return is set, the calculated heating circuit 2 setpoint is also used for heat pump heating request. When flow is set, only for mixer activation.	**Return** / Flow
7.2/8.2 Heating curve end point (-20°C)	The heating curve end point must be set according to the design of the heat pump heating system. The maximum flow or return temperature must be entered here depending on the sensor positioning.	20 … **30 °C** … 70
7.3/8.3 Heating curve parallel shift	Parallel shift of the set heating curve for heating circuit 2/ 3. Pressing the arrow keys once shifts the heating curve up (hotter) or down (colder) by 1K.	-19 ... 0 K ... 19
7.4/8.4 Fixed value reg. return setp. temperature/Flow setp. temperature	Setting the desired set temperature with fixed value regulation selected	*min. setp. temp.* … **40 °C** … 60
7.5/7.6 8.5/8.6 Return setp. temp./Flow setp. temperature minimal Heating	Setting the minimum return set temperature for heating operation. If room control is activated, it is possible to select whether the minimum return set temperature is adapted automatically to the set room set temperature.	**manual** / automatic 15 … 20 °C … 30

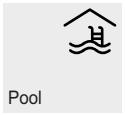
Parameters	Setting	Setting range
7.7/8.7 Return setp. temp./ Flow setp. temperature maximum Heating 7.8/8.8 Return setp. temp./ Flow setp. temperature maximum Heating manual 7.9/8.9 Return setp. temp./ Flow setp. temperature maximum Heating automatic	For panel and radiator heating systems, different maximum temperatures are permitted. The upper limit of the set temperature can be set between 25 °C and 70 °C.	manual / automatic 30 … **50 °C** … 70 1 ... 10 K ... 20
7.10/8.10 Mixer hysteresis	The hysteresis of the mixer forms the neutral zone for the operation of heating/cooling circuit 2/ 3. If the set temperature plus hysteresis is reached, a mixer closed signal is given. If the set temperature minus hysteresis is not reached, a mixer open signal is given.	0.5 … **2.0 K** … 5.0
7.11/8.11 Mixer run time	The runtime between the end positions OPEN and CLOSED is different depending on the mixer used. To achieve optimal temperature regulation in heating/cooling circuit 2/3, the mixer runtime must be set.	1 … **4 minutes** … 6
7.12/8.12 Room control limit temperature	Below the set limit temperature room control, the rooms with a lower room set temperature are not taken into account for overheating with activated Smart-Grid function.	15 … **19 °C** … 30
7.13/8.13 Room control hysteresis bottom	To prevent unnecessary cycling of the control valves, the hysteresis for opening and closing the control valves can be adapted to the room actual temperature depending on the room set temperature.	0.0 … **0.5 K** … 2.0
7.15/8.15 Room control flow 7.16/8.16 Room control flow manual	It is possible to select whether the flow temperature required for the mixer during room control takes place automatically via the determined spread of the system, or manually via a fixed set value.	manual / automatic 0 … **5 K** … 10
7.17/8.17 Silent cooling dewpoint diff.	Increase of the minimum permissible flow temperature, calculated from the measured values of room climate station 1/2. An increased value reduces the risk of condensate formation.	1.5 … **3.5 K** … 5.0

5.16 Domestic hot water

Parameters	Setting	Setting range
9.1 Change-over compressor 2	Setting of the outside temperature below which the domestic hot water preparation takes place with 2 compressors with 2 compressor heat pumps.	-30 … **-25 °C** … 35 *(10)*
9.2 Hysteresis	The hysteresis of the domestic hot water set temperature forms the neutral zone which, if not reached, triggers a domestic hot water request.	2 … **7 K** … 15
9.3 Parallel cooling hot water	Is parallel operation of cooling and domestic hot water possible due to the hydraulic decoupling of cooling circuit and domestic hot water circuit?	**No** / Yes

Parameters	Setting	Setting range
9.4 Setp. temperature	Setting the desired domestic hot water set temperature.	30 ... **50 °C** … 85
9.5 Minimum temperature	Setting the desired domestic hot water set temperature which is also to be maintained during an active domestic hot water lower time or external domestic hot water block.	0 ... 10 °C ... Domestic hot water set temperature
9.6 Maximum temperature	Setting the desired domestic hot water set temperature to be achieved in parallel operation.	30 … **60 °C** … 85
9.7 Reheating	Setting for whether the existing flange heater should also be used for reheating. If “No” is set, the domestic hot water preparation only takes place up to the current heat pump maximum temperature depending on the heat source temperature.	**No** / Yes
9.8 Circulation shut-off delay	The circulation pump is switched by a paddle switch, for example. When the paddle switch switches back again, the circulation pump continues to run for the set time.	1 ... **5 minutes** … 15
9.9 Hot water reset maximum	If reset Yes is set, the determined maximum domestic hot water temperatures in heat pump operation are reset to the value 65 °C. The setting value is returned automatically to No.	**No** / Yes
9.10 Maximum temperature 1 compressor	Display of the determined maximum domestic hot water temperatures depending on the heat source temperature.	
9.11 Maximum temperature 2 compressor		
9.12 Hot water pump 9.13 Hot water manual	Setting the speed of the electronically regulated domestic hot water circulating pump (M18).	automatic Stage 1 Stage 2 **Stage 3** manual 30 …**50 %**…100

5.17 Pool



Parameters	Setting	Setting range
10.1 Change-over compressor 2	Setting of the outside temperature below which the swimming pool preparation takes place with 2 compressors with 2 compressor heat pumps	-30 … **-25 °C** … 35 *(10)*
10.2 Hysteresis	The hysteresis of the swimming pool set temperature forms the neutral zone which, if not reached, triggers a swimming pool request.	0.0 … **5 K** … 20
10.3 Setp. temperature	Setting the desired swimming pool set temperature.	5 … **25 °C** … 60
10.4 Minimum temperature	Setting the desired swimming pool set temperature, which is also to be maintained during an active swimming pool block.	0 ... **10 °C** ... Pool set temperature
10.5 Maximum temperature	Setting the desired swimming pool set temperature to be achieved as a maximum.	30 … **60°C** … 85
10.6 Waste heat utilisation cooling	Setting for whether the waste heat recovery during cooling should take place depending on the thermostat switching state or in continuous operation.	**No** / Yes

Parameters	Setting	Setting range
10.7 Pool reset maximum	With the reset Yes setting, the determined maximum swimming tool temperatures in heat pump operation are reset to the value 65 °C. The setting value is returned automatically to No.	**No** / Yes
10.8 Maximum temperature 1 compressor	Display of the determined maximum swimming pool temperatures depending on the heat source temperature.	
10.9 Maximum temperature 2 compressor		
10:10 Pool pump 10:11 Pool pump manual	Setting the speed of the electronically regulated swimming pool circulating pump (M19).	automatic Stage 1 Stage 2 **Stage 3** manual 30 …**50 %**…100

5.18 Pump control

Pump control

The settings must be selected based on the system hydraulics.

Parameters		Setting	Setting range
M16 function M13		Should the auxiliary circulating pump M16 take over the function of the heating circulating pump M13?	Yes / No
Optimisation heating pump	11.2.1 Heating limit temperature 1	The heating limit temperature refers to the outside temperature. Below heating limit temperature 1, the heating pump is permanently on. At temperatures between heating limit temperature 1 and 2, the heating pump runs in pump optimisation.	- 10 … **15 °C** … Heating limit temp. 2
	11.2.2 Heating limit temperature 2	Above heating limit temperature 2, the heating pump is permanently off. Above the heating limit temperature, the heating pump only runs with a scavenging time request. This results in a demand-based scavenging.	Heating limit temp. 1 … **25 °C** … 35
	11.2.3 Cooling limit temperature 1	Below cooling limit temperature 1, the heating pump is permanently off. Above the cooling limit temperature, the heating pump only runs with a scavenging time request. This results in a demand-based scavenging.	- 10 … **15 °C** … Cooling limit temp. 2
	11.2.4 Cooling limit temperature 2	Above cooling limit temperature 2, the heating pump is permanently on. At temperatures between cooling limit temperature 1 and 2, the heating pump runs in pump optimisation.	Cooling limit temp. 1 … **15 °C** … 35
Pump supply secondary pump		Setting of the lead time of the secondary pump before the compressor starts.	10 … **60 s** … 420
Pump run-on secondary pump		Setting of the delay time of the secondary pumps after the compressor is switched off	0 … **5 s** … 420

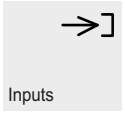
5.19 Outputs

Outputs

Parameters	Description
12.1 Compressor 1	
12.2 Compressor 2	
12.3 Fan/M11	
12.4 M11 Primary pump	
12.5 Internal 4-way valve	
12.6 Nozzle ring heating	
12.7 M16 Add. circulation pump	
12.8 Y12 External 4-way valve	
12.9 H5 Remote fault indicator	
12:10 M12 Primary pump cooling mode	
12:11 M17 Cool. circulation pump	
12:12 Y5 3-way valve	
12:13 E10.1 Immersion heater	
12:14 M21 Mixer Bivalent	
12:15 M21 Mixer renewable	
12:16 M13 Heating circulation pump	
12:17 M21 Mixer 2.Heat circuit	
12:18 M15 Heating circulation pump	
12:19 M22 Mixer 2.Heat circuit	
12:20 M20 Heating circulation pump	

12:21 M21 Mixer 3.Heat circuit	
12:22 N9 Room thermostat	
12:23 E13 2.Refrig. unit	
12:24 M18 Hot water pump	
12:25 E9 Flange heating	
12:26 M24 Circulation pump	
12:27 M19 Pool pump	

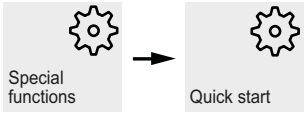
5.20 Inputs



Parameters	Description
13.1 Pressure stat Low pressure	Low pressure contact open = error (Setting low pressure switch NC contact)
13.2 Pressure stat High pressure	High pressure contact open = error (Setting high pressure switch NC contact)
13.3 Pressure stat Defrost	Contact closed = defrost end
13.4 Brine press. switch	Contact open = error
13.5 Throughput switch primary	Contact open = error
13.6 Throughput switch secondary	Contact open = error
13.7 Thermostat Hot gas	Contact open = error
13.8 Thermostat Freeze protection	Contact open = error
13.9 Thermostat Hot water	Contact closed = domestic hot water demand
13:10 Thermostat Pool	Contact closed = swimming pool demand
13:11 Motor protect. compressor	Contact open = error
13:12 Motor protect. primary pump	Contact open = error
13:13 Motor protect. fan	Contact open = error
13:14 EVU block	Contact open = utility company block
13:15 External block	Contact open = external block
13:16 Demand circulation pump	Contact closed = circulation pump demand

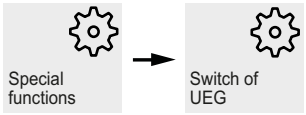
5.21 Special functions

5.21.1 Quick start



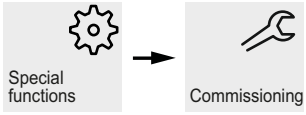
Parameters	Setting	Setting range
14.1 Quick start	Activating the “quick start” function means that the heat pump can start after the safety-relevant times have elapsed. A switch cycle block is ignored.	**No** / Yes

5.21.2 Switch off lower operating limit



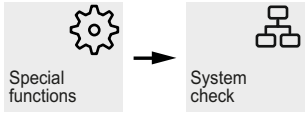
Parameters	Setting	Setting range
14.2 Switch off UEG	Activating the “Switch off lower application limit” function means that the heat pump can start after the safety-relevant times have elapsed. The monitoring for compliance with the lower operating limit is switched off.	**No** / Yes

5.21.3 Commissioning



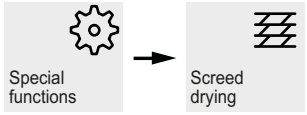
Parameters	Setting	Setting range
14.3 Commissioning mode	When this function is activated, the defrost with air-to-water heat pumps is suppressed for one hour and the 2nd heat generator is released. If a defrost process is already running, it is cancelled.	**No** / Yes

5.21.4 System check



Parameters	Setting	Setting range
14.4 System check	System control on pumps and mixers	
14.4.1 Output M11 14.4.2 Output M18 14.4.3 Output M24 14.4.4 Output M13/M15/M16	When this function is activated, the pumps on the primary side are switched on permanently for a period of 24 hours. The heat pump remains blocked during this time.	**No** / Yes
14.4.5 Mixer M21/M22	When this function is activated, the mixers are first switched to the OPEN direction for the set mixer runtime, and then to CLOSED.	**No** / Yes

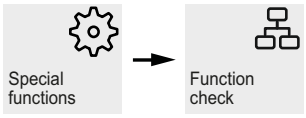
5.21.5 Screed program



Parameters	Setting	Setting range
15.1 Maximum temperature	Setting of the maximum return temperature to be achieved during initial heating.	25 … **35 °C** … 50
15.2 Hot water/ Pool	If this function is selected, a potential domestic hot water or swimming pool demand is permitted during the initial heating.	**No** / Yes
15.3 Function heating	Activation of the heating function program.	**No** / Yes
15.4 Standard program line heating	Activation of the standard program for screed drying	**No** / Yes
15.5 Individual program line heating		
15.5.1 Heat-up duration	Setting the duration for the individual steps of the heat-up phase.	1 … **24** … 120
15.5.2 Hold duration	Setting the hold time.	1 … **24** … 480
15.5.3 Duration Cool down	Setting the duration for the individual steps of the cool-down phase.	1 … **24** … 120

Parameters	Setting	Setting range
15.5.4 Differential temperature heat-up	Setting the temperature difference between two steps in the heat-up phase.	1 … **5K** … 10
15.5.5 Differential temperature Cool down	Setting the temperature difference between two steps in the cool-down phase.	1 … **5K** … 10
15.5.6 Individual program line heating	Activation of the individual program for screed drying	**No** / Yes

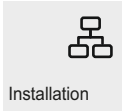
5.21.6 Function check



During the function check, the connected actuators (pump, mixer, etc.) can be switched manually for testing purposes. The function check is active for a set activation time.
The actuators are active for the set runtime. If a function check is activated, the actuators can be switched manually in the Outputs menu.

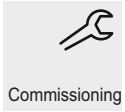
Parameters	Setting	Setting range
14.5 Function check	Function for the installer	
14.5.1 Function check	Activating this function activates a function check for a selectable number of minutes. During this time, individual output functions can be activated in the Outputs menu. The heat pump remains blocked during this time.	**No** / Yes
14.5.2 Activation time		1 ... **30 minutes** ... 60
14.5.3 Run time		1 … **10 seconds** … 99

5.22 Installation



Parameter	Setting	Setting range
16.1 flex input ID1 + ID2	Is digital input ID1 + ID2 used? What function should be assigned to this input?	Thermostat Performance level Smart-Grid
16.2 flex input ID4	Is digital input ID4 used? What function should be carried out when this input is opened?	Frost protection Holiday Hot water Block Summer
16.3 consumption immersion heater	Setting value of the rated input for the electrical immersion heater installed in the buffer tank. This value is included in the efficiency calculation.	0 ... 32.00 kW
16.4 consumption pipe heater	Setting value of the rated input for the electrical pipe heater installed in the heating system. This value is included in the efficiency calculation	0 ... 32.00 kW
16.5 consumption flange heater	Setting value of the rated input for the electrical flange heater installed in the domestic hot water cylinder. This value is included in the efficiency calculation.	0 ... 32.00 kW

6 Commissioning assistant



The commissioning assistant guides you automatically through the settings of all system settings relevant for operation. The menu items available for selection are based on the heat pump type used and hardware. The commissioning assistant must be run through entirely and completed. It is not possible to cancel the process during the commissioning!

Parameters	Description	Setting range
Language	Setting the desired language. Depending on the software version, not all languages listed may be available.	Deutsch English Français Nederlands Italiano Svenska Dansk Magyar Český Slovenský Hrvatski Slovenski Norsk
Heat pump code	The 4-digit heat pump code printed on the type plate can be corrected with these settings.	
Functions	The setting for the desired function should be selected based on the system hydraulics. Note, the function direct circuit and mixer circuit 1 are mutually exclusive. The maximum possible number of available functions is dependent on the hardware used	Domestic hot water Direct circuit Mixer circuit 1 Mixer circuit 2 Mixer circuit 3 Bivalent Renewable Swimming pool Active cooling Passive cooling
Function blocks	The colour assignment of the function must be selected based on the functions wired on the controller. To assign a function to the function blocks "Blue" and "Orange", the extension controller WPM 6.0 with two function blocks is required.	Yellow Green Red ---------- Blue Orange
2.heat generator	Is a pipe heater installed in the system hydraulics? Is an immersion heater installed in the buffer, which is used for heating support?	Pipe heater Immersion heater
Hot water Demand	Does domestic hot water preparation take place with the heat pump? Is a thermostat or a sensor used for this?	Sensor Thermostat
Hot water 2.heat generator	Is a pipe heater installed in the system hydraulics, which can be used for hot water reheating? Is a flange heater installed in the domestic hot water cylinder for reheating and thermal disinfection?	Pipe heater Flange heater
Hot water circulation	Is a circulation pump in place and is it actuated via the heat pump manager? Is it actuated via an impulse or a time function?	Impulse time
1.Circuit	How is heating circuit 1 used?	Heating Cooling

Parameters	Description	Setting range
1.Heat circuit control	Which regulation option is to be used for heating circuit 1? • Outside: Return temperature control depending on the outside temperature and set heating curve • Fixed-setpoint: Return temperature control via a fixed-setpoint • Room temperature: Return temperature control depending on the room temperature of a reference room	Outside Fixed-setpoint Room temperature
1.Heat circuit room control	What hardware is used for the room control heating?	RTM Econ RTH ECon R13 BMS
1.Cool circuit control	Which regulation option is to be used for cooling circuit 1? • Fixed-setpoint: Return temperature control via a fixed-setpoint • Silent cooling: Return temperature control depending on the room temperature of a reference room	Fixed-setpoint Silent cooling
1.Cool circuit room control	What hardware is used for the room control cooling?	RTM Econ RKS BMS
1.Circuit number RTM Econ	How many RTM Econ are used for circuit 1?	1 … 10
2.Circuit	How is heating circuit 2 used?	Heating Cooling
2.Heat circuit control	Which regulation option is to be used for heating circuit 2? • Outside: Return temperature control depending on the outside temperature and set heating curve • Fixed-setpoint: Return temperature control via a fixed-setpoint • Room temperature: Return temperature control depending on the room temperature of a reference room	Outside Fixed-setpoint Room temperature
2.Heat circuit room control	What hardware is used for the room control heating?	RTM Econ BMS
2.Cool circuit control	Which regulation option is to be used for cooling circuit 2? • Silent cooling: Return temperature control depending on the room temperature of a reference room	Silent cooling
2.Cool circuit room control	What hardware is used for the room control cooling?	RTM Econ BKS BMS
2.Circuit number RTM Econ	How many RTM Econ are used for circuit 2?	1 … 10
3.Circuit	How is heating circuit 3 used?	Heating Cooling
3.Heat circuit control	Which regulation option is to be used for heating circuit 3? • Outside: Return temperature control depending on the outside temperature and set heating curve • Fixed-setpoint: Return temperature control via a fixed-setpoint • Room temperature: Return temperature control depending on the room temperature of a reference room	Outside Fixed-setpoint Room temperature
3.Heat circuit Room controller	What hardware is used for the room control heating?	RTM Econ BMS

Parameters	Description	Setting range
3.Cool circuit control	Which regulation option is to be used for cooling circuit 3? • Silent cooling: Return temperature control depending on the room temperature of a reference room	Silent cooling
3.Cool circuit room control	What hardware is used for the room control cooling?	RTM Econ RKS BMS
3.Circuit number RTM Econ	How many RTM Econ are used for circuit 3?	1 … 10
Pool Demand	Does swimming pool heating take place with the heat pump? Is a thermostat or a sensor used for this?	Sensor Thermostat
Cooling	Is a 2nd refrigerator used in the installation?	2nd refrigerator
4-way valve	Is an external 4-way valve installed in the system hydraulics for optimized heating and cooling operation? What function is the 4-way valve used for?	Without 4-way valve (cooling and heating) With 4-way valve (cooling and heating) Without 4-way valve (heating)
Function M16	What function is the auxiliary circulating pump used for in the system hydraulics?	Heating Cooling Domestic hot water Pool 2nd heat generator Renewable

7 Energy-efficient operation

If heating operation takes place depending on the outside temperature, the heat pump manager calculates a return set temperature from the set heating characteristic curve and the current outside temperature.

The heating curve should be set to the calculated maximum return temperature of the heating system. Via the plus + and minus – keys, the heating curve can be moved up or down in parallel on a customer-specific basis to achieve the actual desired room temperatures.

Regulation via the return temperature

Regulating a heat pump heating system via the return temperature has the following advantages:

1) Long runtimes of the heat pump with demand-based heating of the entire circulated heating volume.
2) Recording of the disturbance variables of the heating system.
3) Reducing the temperature spread results in lower flow temperatures with a constant return temperature, thus achieving a more efficient operation.

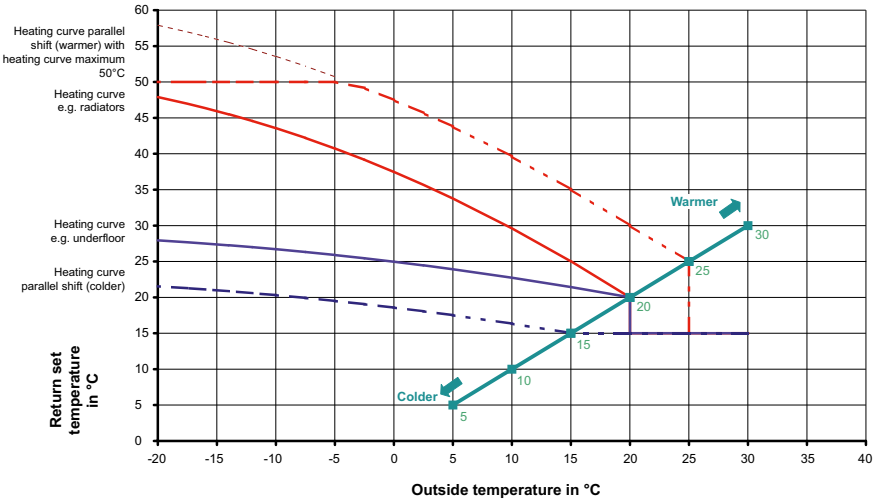
TIP

The heating curve should be set as high as necessary and as low as possible!

7.1 Outside temperature-dependent heating curve

The heating curve must be adapted to the local and structural conditions - separately for heating circuits 1, 2 and 3 - so that the desired room temperature is achieved even with changing outside temperatures. If the outside temperature rises, the return set temperature is lowered, thus ensuring energy-efficient operation of the heating system.

1) In the settings, the maximum required return temperature is entered at –20 °C outside temperature. The goal is to achieve an average, constant room temperature even with changing outside temperatures.
2) All heating characteristic curves meet at an outside temperature of +20 °C and a return temperature of +20 °C, so that heat output is no longer required in this operating point. The bar display (plus and minus keys) can be used to shift this operating point between 5 °C and 30 °C along the inclined marked axis. This shifts the entire heating curve in parallel upwards or downwards by a constant value of 1K per bar unit. The user can carry out this setting according to their individual desired temperature.
3) Each heating curve is limited by the maximum set value. Each heating curve has a lower limit of 18 °C (air-to-water HP) or 15 °C (brine or water-to-water HP).



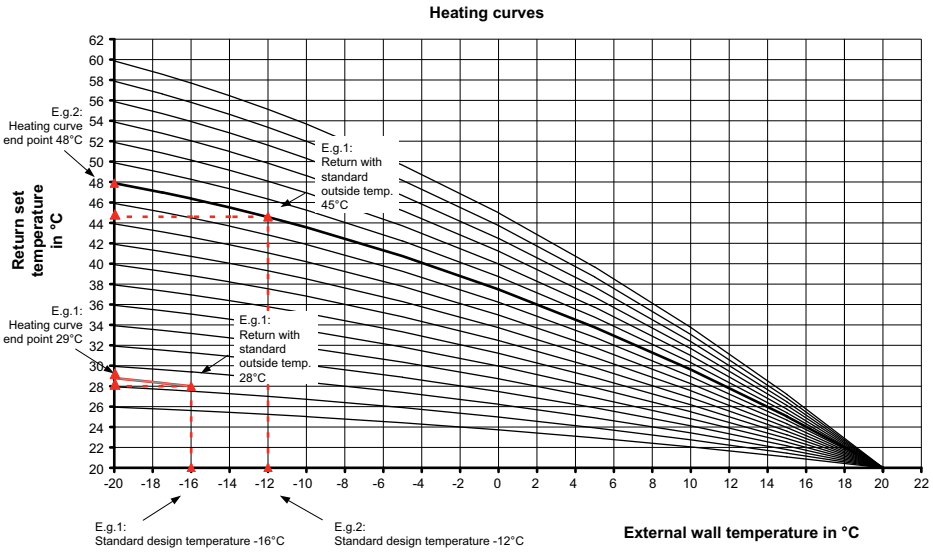
7.1.1 Setting examples

	Underfloor heating 35 °C / 28 °C			Radiators 55 °C / 45 °C		
Standard outside air temperature °C	-12	-14	-16	-12	-14	-16
Required flow temperature (with standard design temperature)	35 °C	35 °C	35 °C	55 °C	55 °C	55 °C
Temperature spread flow/return	7 °C	7 °C	7 °C	10 °C	10 °C	10 °C
Required return temperature (with standard design temperature)	28 °C	28 °C	28 °C	45 °C	45 °C	45 °C
Setting for heating curve end point	30 °C	29 °C	29 °C	48 °C	47 °C	46 °C
	Example 1			Example 2		

A heat distribution system (e.g. underfloor heating) is designed for a maximum flow temperature with a specific standard outside temperature. This is dependent on the location of the heat pump and is between -12 and -18 °C in Germany.

The max. return temperature to be set on the heating controller must be entered with an outside temperature of –20 °C. For this, the maximum return temperature with the specified standard outside temperature in Abb. auf S. 51 must be entered. Via the array of curves, the setting value at -20 °C can be read.

Step 1:
Adjustment of the heating curve to local and structural conditions by setting the gradient (heating curve end point)
Step 2:
Setting of the desired temperature level through parallel shifting of the heating curve up or down (bar display)



7.1.2 Optimisation of the heating curve

There are two setting options for optimising the heating curve:

- Changing the gradient with a higher or lower “heating curve end point”
- Raising or lowering the entire heating curve with the plus and minus keys

If	outside temperature		
	below -7 °C	**-7 to +7 °C**	**over +7 °C**
too cold	“Heating curve end point” value 2 °C to 3 °C higher	Plus 1 °C to 2 °C scale markings higher	Plus 1 °C to 2 °C higher and value “Heating curve end point” 2 °C to 3 °C lower
too hot	“Heating curve end point” value 2 °C to 3 °C lower	Minus 1 °C to 2 °C scale markings lower	Minus 1 °C to 2 °C scale markings lower and value “Heating curve end point” 2 °C to 3 °C higher

7.2 Room temperature control

With highly insulated houses and open design in particular, or when heating individual large rooms, the calculation of the return set temperature can take place via the room temperature of a reference room.

Control behaviour

The larger the deviation between the room and the room set temperature, the faster the return set temperature is adapted.

Where necessary, the response time can be changed via the adjustable interval value (I-value). The larger the interval value, the slower the adjustment of the room set temperature.

The minimum return set temperature adjusts automatically to the set room temperature. If this is not desired, there is the option of switching from “automatic” to “manual” in the menu *“Heat circuit - Return temperature minimal”*.

Requirements:

- For systems with silent cooling, the room climate station or reference room modulator RTH Econ/RTM Econ is used for room temperature recording. For all others, an additional room sensor (R13) must be connected on the analogue input X3/R13.
- Deactivation of an existing individual room control in the reference room
- The required return temperature is recommended as an input for a maximum return set temperature with standard design temperature.
- Even room set temperature, mostly free from increases and decreases

When the room temperature control is activated or the room set temperature is changed, the room temperature may initially be overshot.

7.2.1 Setting examples

Recommended settings for room set temperature 22 °C	Minimum return temperature	Maximum return temperature
Surface heating (35/28 °C) (underfloor, wall, ceiling	22 °C	30 °C
Low temperature radiators (45/38 °C)	25 °C	40 °C
Radiators (55/45 °C)	30 °C	50 °C

For optimal regulation, the regulation range between the minimum and maximum return temperature should be as small as possible. The automatic operating mode switching enables the heating operation to be blocked from a selectable outside temperature.

7.2.2 Optimisation of the room temperature control

	1st measure	2nd measure
Building too warm	Reduce the room set temperature	
Building not getting warm	Increase the room set temperature, Increase the volume flow	Increase the maximum return temperature
Reference room warm, individual rooms (e.g. bathroom) too cold	Hydraulic alignment (reduce volume flow in the reference room)	
Reference room not reaching the room set temperature, individual rooms (e.g. bathroom) are warm	Hydraulic alignment (increase volume flow in the reference room)	Increase the maximum return temperature

7.3 Fixed value regulation

For special cases (e.g. charging a buffer to constant temperature), an outside temperature-dependent characteristic curve can be set. When the room temperature control is activated or the room set temperature is changed, the room temperature may initially be overshot.

8 Domestic hot water preparation

For domestic hot water preparation, domestic hot water cylinders with sufficiently large heat exchange surfaces must be used, that are able to transfer the maximum heat output of the heat pump permanently.

The regulation takes place via a sensor (R3) installed in the domestic hot water cylinder, which is connected to the heat pump manager.

The achievable temperatures in pure heat pump operation are below the maximum flow temperature of the heat pump.

For higher domestic hot water temperatures, the heat pump manager offers the option of actuating a flange heater.

Alternatively, regulation can take place via a thermostat. In this application, targeted reheating via a flange heater is not possible.

8.1 Basic heating

A domestic hot water request is detected if the current domestic hot water temperature is < domestic hot water set temperature - domestic hot water hysteresis.

A domestic hot water request is ended if the domestic hot water set temperature or the heat source-dependent determined heat pump maximum temperature is reached.

The domestic hot water preparation can be interrupted by defrosting or by the high pressure protection program.

Menu	Submenu	Setting
Preconfiguration	Domestic hot water preparation	Yes with sensor
Preconfiguration	Flange heater	No

8.1.1 Achievable domestic hot water temperatures

The maximum domestic hot water temperature that can be achieved in pure heat pump operation depends on:

- The heat output of the heat pump
- The the heat exchanger surface installed in the cylinder
- The volume flow depending on the pressure drop and delivery rate of the circulating pump.

8.1.2 Heat source-dependent domestic hot water temperatures

The heat pump manager automatically determines the maximum possible domestic hot water temperature, referred to as the heat pump maximum temperature.

The heat pump maximum temperature is also dependent on the current temperature of the heat source air, brine or water. To ensure that the maximum possible domestic hot water temperature is always achieved, the permissible range of the heat source temperature is divided into temperature ranges. A specific heat pump maximum temperature is assigned to each range, each heat pump maximum temperature is set to 65 °C as the default value.

If the high pressure switch is triggered during domestic hot water preparation with the heat pump, the current heat source temperature is recorded and the corresponding heat pump maximum temperature is determined as follows:
1 K is deducted from the current measured domestic hot water temperature and saved as the heat pump maximum temperature.

8.2 Reheating

Reheating means that the heat pump takes over the domestic hot water preparation until the heat pump maximum temperature is reached. Another heat generator then takes over the domestic hot water preparation until the desired domestic hot water set temperature is reached. Reheating is only activated if the desired set temperature is higher than the current heat pump maximum temperature.

Reheating is started if

- the domestic hot water temperature is higher than the maximum temperature that can be achieved with the heat pump.

If the domestic hot water temperature falls below the domestic hot water set temperature hysteresis hot water during reheating, the reheating is stopped and basic heating is started via the heat pump.

The selection of the relevant heat generator for the domestic hot water generation depends on the mode of operation of the heat pump heating system, the configurations and the current statuses of the system.

The reheating must be released in the menu "*Settings – Hot water reheating*".

Menu	Submenu	Setting
Preconfiguration	Domestic hot water preparation	Yes with sensor
Preconfiguration	Flange heater	Yes
Settings	Domestic hot water reheating	Yes

8.3 Thermal disinfection

A start time is specified for thermal disinfection. When the thermal disinfection is started, the system immediately attempts to reach the set temperature. The selection of the heat generator used for this depends on the mode of operation of the heat pump heating system, the configurations and the current statuses of the system. Thermal disinfection is ended when the set temperature is reached.

For the thermal disinfection setting menu to be released, a bivalent heating system and/or flange heater must be set with "Yes" in the preconfiguration.

If the set temperature is not reached after 4 hours, the thermal disinfection is cancelled. The set start time can be activated or deactivated individually for each weekday.

8.4 Domestic hot water lower time

A domestic hot water lower time can be set for two different times and weekdays. Despite a domestic hot water lower time, a minimum domestic hot water temperature can be defined for comfort purposes. The minimum domestic hot water temperature is always maintained during a domestic hot water block. A domestic hot water request takes place if the minimum domestic hot water temperature hysteresis is not reached.

9 Program description

9.1 Limit temperature

The outside temperature at which the heat pump just covers the heat consumption is known as limit temperature 2nd heat generator or bivalence point. This point is marked by the transition from pure heat pump operation to bivalent operation together with immersion heater or boiler.

The theoretical bivalence point can deviate from the optimal point. Particularly in transition periods (cold nights/ warm days), a lower bivalence point can reduce the energy consumption according to the wishes and habits of the operator. Therefore, a limit temperature for releasing the 2nd heat generator can be set in the menu *"2. heat generator – Limit temperature"*.

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

In *mono energy* operation, a limit temperature of –5 °C is strived for. The limit temperature is determined from the outside temperature-dependent building heat consumption and the heat pump heat output curves.

9.2 Blocking requests

Different statuses and settings can result in the heat pump request being blocked. The indicated blocks are reset automatically or are removed once they have been addressed.

9.2.1 Utility block

The utility company (*E*nergie-*V*ersorgungs-*U*nternehmen - EVU) can make a temporary switch off of the heat pump a condition for low-cost electricity tariffs. During a utility block, the voltage on terminal X3/A1 is interrupted.

For systems without utility block, the link cable provided must be inserted on the relevant terminal points.

The utility block is set in the menu *"2. heat generator – EVU block"*.

With bivalent systems, different responses to a utility block are possible:

Load stage 3 only

Heat pump blocked, the 2nd heat generator is only released in load stage 3.

Permanent:

The 2nd heat generator is always released in the event of a heat request during a utility block.

Limit temperature dependent

Heat pump blocked, the 2nd heat generator is released below the selectable limit temperature EVU3.

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

For an external heat pump operation block that does not reset automatically after max. 2 hours, the external disable contactor (contact X3/A2) must be used. If the minimum permissible return temperature is not met, the heat pump is also released when a blocking signal is present.

9.2.2 Line load

The line switch-on load is a requirement of the utility companies. It can last for up to 200 seconds after the voltage is restored or after utility block. The line load can not be bypassed.

9.2.3 Minimum pause time

To ensure adequate pressure compensation in the refrigeration circuit and to protect the heat pump, it can take up to 5 minutes to switch on the compressor again. The heat pump starts after the minimum pause time has elapsed in order to fulfil a pending demand. The minimum pause time can not be bypassed.

9.2.4 Switch cycle block

According to the connection conditions of the utility companies, the heat pump may only switch on 3 times per hour. The heat pump manager will therefore only allow a switch-on every 20 minutes as a maximum.

9.3 2nd heat generator

9.3.1 Control of immersion heaters

In mono energy systems, electrical additional heating systems are used. They are switched on or off depending on the heat consumption requirements, if "*mono energy*" operating mode is selected in the preconfiguration menu and the set limit temperature is not met.

9.3.2 Control pipe heating

An electrical pipe heating can be used in mono energy systems. The electrical pipe heating is selected in "Preconfiguration - Electric heating - Pipe heating Heating/DHW/SP" and switched on or off based on demand in heating, domestic hot water or swimming pool mode.

9.3.3 Constant control boiler

With this type of boiler, the boiler water is constantly heated to a fixed set temperature (e.g. 70 °C) if a release from the heat pump manager is in place. The set temperature must be set high enough that the domestic hot water preparation can also take place via the boiler if necessary. The mixer is controlled by the heat pump manager, which issues a request to the boiler as necessary and adds enough hot boiler water to reach the desired return set temperature or domestic hot water temperature. The boiler is requested via the output 2nd heat generator of the heat pump manager and the operating mode of the 2nd heat generator must be coded to "constant".

9.3.4 Sliding control boiler

In contrast to a constant control boiler, the sliding control boiler delivers the heating water temperature to match the outside temperature directly. The 3-way reversing valve has no control function and is only responsible for guiding the heating water flow past the boiler circuit or through the boiler depending on the operating mode.

In pure heat pump operation, the heating water is directed past the boiler to avoid losses due to the heat emission of the boiler. If a weather-compensated burner regulation is already in place, the power supply for the burner regulation must be interrupted during exclusive heat pump operation. For this, the control of the boiler must be connected to the output 2nd heat generator of the heat pump manager and the operating mode of the 2nd heat generator must be coded to “sliding”. The characteristic curve of the burner regulation is set according to the heat pump manager.

9.3.5 Special program for older boilers and central storage systems

If a request was issued to the second heat generator and the special program is activated in the menu *“2. heat generator”*, the 2nd heat generator remains in operation for at least 30 hours. If the heat consumption reduces in this time, the second heat generator enters “standby mode” (2nd heat generator connected to voltage, but mixer CLOSED). It is only switched off completely if no request is issued for the 2nd heat generator or 30 hours.

This function can be used for bivalent systems as follows:
1. With older oil or gas boilers to prevent corrosion damage due to frequent dropping below the dew point.
2. With central storage systems so that the storage charging is guaranteed for the following day irrespective of the current heat consumption.

9.3.6 Bivalent-parallel

In “*2. heat generator”*, the “Limit temperature parallel” is defined. If the limit temperature parallel is not met, a parallel request is sent to the heat pump and the 2nd heat generator if required.

9.3.7 Bivalent-alternative

In the menu “*2. heat generator”*, the “Limit temperature alternative” is defined. If the limit temperature alternative is not met, the heat pump is blocked and the 2nd heat generator is released for both heating and domestic hot water preparation.

If alternative operation rather than parallel is always desired, the limit temperatures alternative and parallel must be given the same value.

9.3.8 Bivalent-renewable

When integrating a renewable heat source (e.g. solar, wood), it must be given priority over heat pump operation. To this end, bivalent-renewable is coded in the preconfiguration. While the renewable storage is cold, the system behaves like a mono energy system.

The sensor of the renewable storage is connected to analogue input N1-B8. The mixer outputs of the bivalence mixer are active.

For heat pumps without an integrated flow sensor, one must be retrofitted (N1-B5).

Basic function:

The temperature in the renewable storage is recorded and compared with the flow temperature of the relevant request (domestic hot water, heating or swimming pool). If the temperature is higher than the conditions listed below, the heat pump is blocked, the renewable storage is used as a 2nd heat generator and the bivalence mixer is controlled accordingly.

Block by heating request:

If the temperature in the storage is 2-20 K higher than the current flow temperature, the heat pump is blocked in the event of a heating request. It is only released again when the difference between the renewable storage and the flow is less than half of the switching value.

For solar integrations, the selectable overtemperature must be set to the maximum value to prevent the heat pump from cycling.

Block by domestic hot water request:

If the temperature in the storage is 2-5 K higher than the current domestic hot water temperature, the heat pump is blocked in the event of a domestic hot water request. It is only released again when the difference between the renewable storage and the domestic hot water is less than half of the switching value.

Block by swimming pool request:

If the temperature in the storage is higher than 35 °C (value can be set in the menu - Settings - 2. heat generator overtemperature of 10–50 °C), the pump is blocked in the event of a swimming pool request. It is only released when the temperature in the parallel buffer is 5K below the switching temperature again.

As soon as one of the three blocks outlined above is in place, the heat pump is blocked and the display shows: HP waiting, block BR. The output 2nd heat generator is not actuated.

Mixer control:

If no bivalent-renewable block is in place, the mixer is controlled permanently CLOSED.

If a bivalent-renewable block is in place due to domestic hot water or swimming pool, the mixer is controlled permanently OPEN.

If a bivalent-renewable block due to heating is in place, the mixer regulation is active.

9.4 Power control

The heat pump manager defines a maximum of 3 load stages, L1, L2 and L3, which it switches depending the heat consumption. If the heat consumption rises, it switches to the next highest load stage and if the heat consumption falls, it switches to the next lowest load stage.

L1: Heat pump runs with one compressor

L2: Heat pump runs with two compressors

L3: Heat pump runs and 2nd heat generator is active (not with monovalent systems)

- After commissioning or after a power failure, the heat pump manager always starts in load stage L1.
- The load stages are not redefined during defrosting, swimming pool preparation, domestic hot water request, or during a utility block.

9.4.1 Heat pumps with one compressor

Criteria for switching:

- from L1 to L3, if the heat pump manager requests “more heat” for longer than 60 minutes and, at the same time, the outside temperature is below the limit temperature of the 2nd heat generator for longer than 60 minutes
- from L3 to L1, if the heating controller requests “less heat” for longer than 15 minutes or the limit temperature is exceeded.

9.4.2 Heat pumps with two compressors

Criteria for switching:

- from L1 to L2, if the heat pump manager requests “more heat” for longer than 25 minutes,
- from L2 to L3, if the heat pump manager requests “more heat” for longer than 60 minutes and, at the same time, the outside temperature is below the limit temperature for longer than 60 minutes,
- from L3 to L2 or L1, if the heat pump manager requests “less heat” for longer than 15 minutes or the limit temperature is exceeded,
- from L2 to L1, if the heat pump manager requests “less heat” for longer than 15 minutes.

In load stage L1, a compressor of the heat pump is switched on or off according to the “more” or “less” signals of the heat pump manager. In stage L2, a compressor of the heat pump runs constantly to cover the basic load. The second compressor is switched on or off in accordance with the “more” or “less” signals of the heat pump manager. In stage L3, both compressors run constantly to cover the increased basic load, the second heat generator is regulated. There is only ever one compressor running during defrosting.

Load stage	Heat pump with one compressor	Heat pump with two compressors
Stage L1	only one compressor cycling	only one compressor cycling
Stage L2	-	1 compressor basic load, 1 compressor cycling
Stage L3	one compressor and second heat generator if necessary	both compressors and second heat generator
Defrost	Compressor running	One compressor running
Hot water heating	Compressor running	One or two compressors are running depending on the outside temperature
Swimming pool heating	Compressor running	One or two compressors are running depending on the outside temperature

9.4.3 High temperature air-to-water heat pumps

With outside temperatures over 10 °C, there is generally only 1 compressor running. If the outside temperature is below 10 °C and the flow temperature is higher than 50 °C, both compressors are released:

Compressor 1 is switched on first, followed shortly after by compressor 2. If the request disappears or a block becomes active, both compressors are switched off at the same time.

With regard to the load stage, the high temperature heat pump behaves like a 1-compressor heat pump in this temperature range, regardless of the selection in the Configuration menu, i.e. there is no load stage 2.

If the outlined conditions for switching to load stage 3 are fulfilled, the 2nd heat generator is released.

9.5 Hysteresis

The so-called hysteresis can be set for different requirements in the menu. The hysteresis forms a “neutral zone” around the relevant set temperature. If the current temperature is lower than the set temperature reduced by the hysteresis, a request is detected. This remains in place until the current temperature has exceeded the upper limit of the neutral zone. This results in a switch cycle around the setpoint.

Hysteresis return set temperature

For the heating request, a hysteresis can be set around the return set temperature.

If the hysteresis is large, the heat pump runs for longer and the temperature fluctuations in the return are correspondingly high. With a small hysteresis, the compressor run times are reduced and the temperature fluctuations are lower.

For surface heating systems with relatively flat characteristic curves, a hysteresis of approx. 1 K must be set, as an excessively large hysteresis can prevent the heat pump from switching on.

9.6 Control of the circulating pumps

The control of the heating, domestic hot water or swimming pool circulating pump determines where the heat generated by the heat pump should flow. The separate processing of different requests enables the heat pump to always work with the minimum possible flow temperature, thus ensuring energy-efficient operation.

With heat pumps for heating and cooling, additional cooling circulating pumps can be controlled.

Pump assemblies with check valves guarantee defined flow directions.

In the summer operating mode, the heating pump runs for 1 minute every 150 hours (this prevents the heating pump from jamming at the start of the heating period).

9.6.1 Frost protection

Irrespective of the heat circulating pump settings, they always run in heating, defrost mode and when there is a risk of frost. For systems with multiple heating circuits, the 2nd/3rd heat circulating pump has the same function.

CAUTION

In order to guarantee the frost protection function of the heat pump, the heat pump manager must not be deenergised and the heat pump must have flow through.

9.6.2 Heat circulating pump

For the heat circulating pump (M13, M15, M20), an outside temperature-dependent heating pump optimisation is set in the menu "*Pump control - Optimisation heating pump*".

If the selected limit temperature is not reached, the heating pump optimisation is inactive. The heat circulating pumps are permanently in operation, except during domestic hot water, swimming pool preparation and in "*Summer*", operating mode.

If the selected limit temperature is exceeded, the heating pump optimisation is active. The heat circulating pumps run after a mains switch-on and for 30 minutes after the heat pump is switched off. If the heat circulating pumps had been switched off for longer than 40 minutes or if the return set temperature has intentionally been increased via a raise, the heat circulating pumps are activated for a 7 minute scavenging time to supply the representative temperature of the heating circuits to the return sensor (R2, R2.1) again.

If a switch takes place from heating to domestic hot water or swimming pool preparation, the heat circulating pump carries out an after-run.

The heat circulating pumps are permanently in operation if the minimum system temperatures are not met and with temperatures below 10 °C on the frost protection sensor (R9) of the air-to-water heat pumps.

In Summer operating mode, the circulating pump runs for 1 minute every 150 hours. This prevents the shaft from jamming.

9.6.3 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 issued during heating operation, the heat circulating pump is deactivated while the heat pump is running and the domestic hot water circulating pump is activated.

9.6.4 Swimming pool circulating pump

The swimming pool circulating pump (M19) runs during swimming pool preparation. A running swimming pool preparation is interrupted at any time by a domestic hot water request, defrosting process or by an increase in the heating characteristic curve (e.g. after night lowering), but not by a heat pump manager "more" signal. If the request is still in place after a 60-minute swimming pool preparation, the swimming pool circulating pump is deactivated for 7 minutes and the heat circulating pump is activated for a 7-minute scavenging time to supply the representative temperature of the heating circuit to the return sensor again. If the heat pump manager generates a "more" signal during these 7 minutes, the heating request is processed first.

In Summer operating mode, the swimming pool preparation is not interrupted by a scavenging time after 60 minutes.

9.6.5 Auxiliary circulating pump

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

In Summer operating mode, the circulating pump runs for 1 minute every 150 hours. This prevents the shaft from jamming.

9.6.6 Primary pump for heat source

The primary pump (M11) supplies the energy of 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 pump or brine circulating pump always runs if the heat pump is switched on. It starts up 1 minute before the compressor and switches off 1 minute after the compressor.

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

9.6.7 Circulation pump

If there is the option of connecting a circulation pump (M24), it can be requested via an impulse input or via time programs.

If the circulation pump is requested via the impulse input (X3/G - ID17), the delay time can be defined in the menu "*Hot water circulation*". If the request takes place via a time program, it can be set for two different times and weekdays.

TIP

A circulation line uses large amounts of energy. To save on energy costs, circulation should not be used. If this is unavoidable, it is advisable to adapt the time window to the optimal conditions. A better approach is to have the circulation running via an impulse for a specific time. This function is also possible with the heat pump manager.

9.7 Building management system

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

- Transferring the set values on an interface via the BMS (Building Management System). Different protocols and interfaces are available for this.
- Wiring digital inputs with the option of influencing the described power control on the heat pump manager. There is also the option of switching the operating mode via digital inputs both from heating to cooling and influencing it via a parametrizable external block (frost protection/domestic hot water/holiday/summer).

CAUTION

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

9.7.1 BMS interface

On the BMS interface, the extensions available as special accessories for connection to:

- LAN
- KNX
- Modbus

are provided.

Via these extensions, the operating data and history can be read out and settings such as Modus or setpoint specifications can be made, among other things.

In general, a request from the heat pump in conjunction with the building management system should be favoured over an interface.

If an interface such as this is used, the following programming is suggested on the heat pump manager. Depending on the number of heating or cooling circuits, they are set to a fixed value regulation. The set temperature calculated by the building management system is transferred to the heat pump manager as the fixed value temperature. The heat pump is also switched to the Auto, Summer and Cooling mode via the building management system.

Further information on these options can be found in the description for the relevant product.

9.7.2 Compressor control via digital inputs

In addition to the setpoint specification via the building management system, the compressor can also be controlled via digital inputs.

Load stages
The load stages (L) are influenced via the digital inputs N1-J5/ID1 and N1-J5/ID2.
An overview of the load stage switching is shown in the table.

Load stage	N1-J5/ID1-X3/G	N1-J5/ID2-H§/G
Stage L1	closed	open
Stage L2	open	closed
Stage L3	closed	closed

The load stage switching takes place as described in load stage controls.

It must be noted here that the building management system can increase and reduce the load stages within the operating limits. The TAB of the utility companies are still in effect here. The set temperatures set on the heat pump manager are ignored. In extreme cases, the heat pump is only blocked via the operating limits (high and low pressure, flow and return temperature) or switched off by the safety functions.

The table shows the load stage switchings and their impact on the compressors and 2nd heat generator or refrigerator.

Switching the load stages

With parallel connections of heat pumps, it is advisable to set up and program the load stages as a ring connection. This means that, depending on the required output, heat pump 1 is released with L1, then heat pump 2 with L1 and heat pump 3 with L1. If additional power is required, heat pump 1 is released with L2, followed by heat pump 2 with L2 and heat pump 3 with L3. Switching back takes place in the same way. Firstly, heat pump 1 is switched in L1, heat pump 2 in L1 and then heat pump 3 in L1. This means that the compressors not only receive the same runtimes, but the heat pumps are also operated in the most efficient way with this measure.

Load stage	Description	Compressor 1	Compressor 2	2nd heat generator/ refrigerator
Stage L1	Set temperature - hysteresis	on	off	off
	Set temperature + hysteresis	off	off	off
Stage L2	Set temperature - hysteresis	always on	on	off
	Set temperature + hysteresis	always on	off	off
Stage L3	Set temperature - hysteresis	always on	always on	on
	Set temperature + hysteresis	always on	always on	off

When programming the load stage switching via the building management system, it is important to note the heat-pump relevant minimum pause time, switch cycle block and the utility block where applicable.

9.7.3 External block

The heat pump can be blocked or released for one of the following functions via the digital input N1-J5/ID4-X3/G (external block):

- Frost protection
  - Heat pump maintains minimum system temperatures, domestic hot water and swimming pool preparation is blocked
- Domestic hot water block
  - Heat pump is released, 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 released

External block	N1-J5/ID4-X3/G
active	open
inactive	closed

Frost protection is guaranteed in all cases.

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

9.7.4 Switching heating/cooling

With heat pumps for heating and cooling, the switching of the operating mode takes place via a digital input on the expansion mode N17.1-J4/ID4-X3/G.

Operating mode	N17.1-J4/ID4-X3/G
Heating	open
Cooling	closed

10 Commissioning of air-to-water heat pumps

To guarantee the defrosting with air-to-water heat pumps, the return temperature must be at least 18 °C to prevent the defrosting from being cancelled due to the value falling below the minimum permissible temperature on the frost protection sensor.

Activating the commissioning function (special function) releases the 2nd heat generator for one hour, suppresses a defrosting process or cancels a defrosting process currently in progress.

The heat circulating pump runs permanently during commissioning and a domestic hot water or swimming pool request is ignored.

With low heating water temperatures, the buffer tank must be heated up first before the individual heating circuits are opened one after the other.

11 Initial heating program (screed drying)

The initial heating of a screed takes place in accordance with defined standards and directives, which have, however, been adapted to the requirements of a heat pump heating system.

The individual programs are activated in the menu "*Special functions - Screed drying*").

The following applies during initial heating:

- The heat circulating pumps for heating circuits 1, 2 and 3 run permanently
- Programmed lowers or increases are ignored, a fixed hysteresis of ± 0.5 K applies (regardless of the configuration in the menu)
- Limit temperature for the 2nd heat generator fixed at +35 °C (regardless of the configuration in the menu)
- The calculated set temperature applies for all heating circuits
- The mixer of heating circuit 2/3 is controlled with permanently open
- In the event of a fault or an interruption in voltage, the selected program is only interrupted. Once the voltage is restored or the fault is acknowledged, the selected program is continued.

If there are no special requirements from the manufacturer, the use of the standard program line heating is recommended (max. return temperature 35-40 °C).

If no key is pressed 3 minutes after an initial heating program is activated, the display switches every minute.
The current heat up step, set temperature, elapsed hours and required hours are shown in the bottom display line.

11.1 Implementation of the directive for a heat pump heating system

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

With high humidity levels in the screed, the defined temperatures are often not reached in the specified time. For sufficient drying, however, it is essential that the temperature level is maintained for a specific period of time.

For this reason, the days described in the standard are converted to program steps, where one program step corresponds to the combination of the number of days or hours and the relevant temperature.

Depending on the ratio of heat output from the heat pump and heated living area, the specified minimum heat up times can also be significantly exceeded, as the required minimum number of hours is only totalled up after the set temperature is reached.

The relevant standards and directives describe the flow temperature of the heating system in each case. The return temperature is key for controlling the heat pump.

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

11.2 Heating function program in accordance with DIN EN 1264-4

This program serves as a function test for underfloor heating and is only carried out after the specified rest time of the screed.

This is designed to highlight any faults in the screed and in the underfloor heating.

1). Step: A constant return temperature of 20 °C must be maintained for 72 hours (3 days).

2). Step: The maximum return temperature (selectable) must be maintained for 96 hours (4 days).

3). Step: The heat pump remains off until the return temperature has dropped below 20 °C.

The duration of step 3 is limited to a maximum of 72 hours, as, in high outside temperatures, the return temperature may not fall below 20 °C.

The heating function program should be carried out to check the function of the underfloor heating system. With cement screed, this may take place after 21 days at the earliest, with calcium sulphate screed, after 7 days at the earliest after the screed work is complete.

Once the screed has been created, after the required rest time and after the heating function program, the readiness for further processing must be confirmed before applying the upper floor covering.

11.3 Line heating to dry out the screed

11.3.1 General notes

This program reduces the humidity in the screed to a level where the floor covering can be applied.

The moisture content must be measured, however, and additional drying carried out where necessary.

The guidelines for drying the screed specify a fixed number of steps with defined temperatures and durations. This sequence can be selected in the menu as *"Standard program line heating"*.

The standard program should be used in most cases in agreement with the screed installer. The sequence defined for the standard program should only be individually adapted if there are special requirements for the heating. In this case, select *"Individual program line heating"* in the menu.

11.3.2 Standard program line heating

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

Step 1-4: Heat up processes
Step 5: Hold
Step 6-8: Cool down processes

Steps 1 to 4 are heat up processes lasting 24 hours each. With each step, the return set temperature is increased from 20 °C to the maximum return temperature.

To end a program step, two conditions must be met. The corresponding set temperature must have been reached or exceeded and the duration of 24 hours must have elapsed. If the temperature is reached before the 24 hours have elapsed, the heat pump maintains the relevant set temperature for the remaining duration. No evaluation takes place of how long this temperature was actually reached for.

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

The duration for which the maximum return temperature was actually reached is totalled up. Upper limit open, lower limit setpoint - hysteresis.

Only when the totalled time has reached the value of 264 hours is this program step ended.

Steps 6 to 8 are cool down steps lasting 24 hours each. The return set temperature is lowered with each step from the maximum return temperature to 20 °C.

To end a program step, two conditions must be met. The value must be lower than the corresponding set temperature and the duration of 24 hours must have elapsed. If the value drops below the temperature before the 24 hours have elapsed, the heat pump maintains the corresponding set temperature for the remaining duration. No evaluation takes place of how long this temperature was actually reached for, however.

The duration of the cool down processes is limited to a maximum of 72 hours, as, in high outside temperatures, the value may not drop below the required return temperature.

Example:

Max. return temperature: 32 °C

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

11.3.3 Individual program line heating

This program enables the following settings to be made:

- *Differential temperature heat-up:*
  Starting from the initial temperature 20 °C through to the set maximum temperature, the set temperature is increased by the set difference with each program step.
  The number of steps is therefore based on these factors.
- *Heat-up duration:*
  The number of hours in which the relevant set temperature must be reached and maintained (function as described above) can be entered here.
- *Hold duration:*
  The number of hours for which the maximum set temperature must be maintained can be entered here.
- *Differential temperature Cool down:*
  Starting from the set maximum temperature through to the initial temperature 20 °C, the set temperature is reduced by the set difference with each program step.
  The number of steps is therefore based on these factors.
- *Duration Cool down:*
  The number of hours in which the relevant set temperature must be reached and should be maintained can be entered here.

12 Extended installation instructions for the heat pump manager heating/cooling

12.1 Active cooling

12.1.1 Heat pumps without additional heat exchanger

The cold generation takes place actively via heat pump process reversal. The switching of the refrigeration circuit from heating to cooling operation takes place via an internal four-way reversing valve.

When switching from heating to cooling operation, the heat pump is blocked for 10 minutes so that the different pressures of the refrigeration circuit can balance out.

The requests are processed as follows:

- Domestic hot water before
- Cooling before
- Pool

During domestic hot water or swimming pool preparation, the heat pump works as in heating operation.

12.1.2 Additional heat exchanger for waste heat recovery

Via an additional heat exchanger in the hot gas, the waste heat generated during cooling can be used for domestic hot water or swimming pool preparation. This requires *"Yes"* to be set in the Heat exchanger menu item.

The requests are processed as follows:

- Cooling before
- Domestic hot water before
- Pool

In the *"Hot water"* menu item, the hot water maximum temperature is set. While the domestic hot water temperature is below this limit, the domestic hot water circulating pump also runs during cooling. After the set maximum temperature is reached, the domestic hot water circulating pump is switched off and the swimming pool circulating pump is switched on (regardless of the swimming pool thermostat input).

If no cooling requirement is in place, domestic hot water or swimming pool requests can be processed. However, these functions are cancelled after a maximum of 60 minutes uninterrupted runtime to give priority to processing an active cooling requirement.

12.2 Passive cooling

Deep down, groundwater and the ground are significantly colder than the ambient temperature in summer. A plate heat exchanger installed in the groundwater or brine circuit transfers the refrigeration capacity to the heating/cooling circuit. The compressor of the heat pump is not active and is therefore available for domestic hot water preparation. The parallel operation of cooling and domestic hot water preparation can be activated in the menu item *"Hot water- Parallel cooling hot water"*.

For parallel operation of cooling and domestic hot water preparation, special requirements for the hydraulic integration must be guaranteed (see planning documents).

12.3 Program description cooling

12.3.1 Cooling operating mode

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

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

Switching off the cold generation

The following limits are in place for protection:

- The flow temperature is below a value of 7 °C
- Triggering of the dew point monitor in sensitive parts of the cooling system
- Reaching the dew point with purely silent cooling

12.3.2 Activating the cooling functions

When cooling operation is activated, special control functions are carried out. These cooling functions are carried out by the cooling controller separately from the other control functions.

The following can prevent the activation of the cooling function:

- The outside temperature is below 3 °C (risk of frost)
- The outside temperature is below the cooling operating limit with reversible air-to-water heat pumps.
- The cooling controller is not in place or the connection is faulty (I/O extension).
- Neither silent nor dynamic cooling was selected in the heating/cooling circuit settings

In these cases, the Cooling operating mode remains active, but the control behaves as in the Summer operating mode.

12.3.3 Circulating pumps in cooling operation

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

The heat circulating pump of heating circuit 1 (M14) is not active in cooling operation if pure silent cooling is configured.

The heat circulating pump of heating/cooling circuit 2 (M15) is not active if only “heating” is selected.

The heat circulating pump of heating/cooling circuit 3 (M20) is not active if only “heating” is selected.

Heating components can be switched in heating or cooling operation via the floating contact N17.2 / N04 / C4 / NC4 (e.g. room temperature controller)

Passive cooling

The supply for the cooling system can take place via the existing heat circulating pump (M13) and via an additional cooling circulating pump (M17).

The cooling circulating pump (M17) runs permanently in “Cooling” operating mode.

Depending on the hydraulic integration with passive cooling, the running behaviour of the heat circulating pump (M13) can be changed under *“Settings - Pump control”*.

12.3.4 Silent and dynamic cooling

Different system configurations can be achieved depending on the integration diagram. The selection takes place in the menu *“Settings – Cooling”*.

- **Pure dynamic cooling** (e.g. fan convectors)
  The control corresponds to a fixed value regulation. The relevant desired return set temperature is set in the menu item Settings.
- **Pure silent cooling** (e.g. underfloor, wall surface or ceiling cooling)
  The control takes place based on the room temperature. The key factor is the temperature of the room where the room climate station 1 is connected according to the connection diagram. The relevant desired room temperature is set in the menu item Settings.
  The maximum transferable cooling capacity is heavily dependent on the relative humidity during silent cooling. A high humidity reduces the maximum cooling capacity, as the flow temperature is not reduced further once the calculated dew point is reached.
- **Combination of dynamic and silent cooling**
  The control takes place separately in two control circuits.
  The control of the dynamic circuit corresponds to a fixed value regulation (as described under dynamic cooling).
  The control for silent cooling takes place based on the room temperature (as described under silent cooling) by activating the mixer of heating circuit 2/3 (silent heating/cooling circuit).

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

12.4 Room temperature control

Heating technology systems are usually equipped with automatic mechanisms for controlling the room temperature on a room-by-room basis.

In heating operation, the room thermostats record the current temperature and open the controller (e.g. actuator) if the value is below the specified set temperature.

In cooling operation, the room thermostats must either be deactivated or replaced by ones suitable for heating and cooling.

In this case the room thermostat behaves in the opposite way in cooling operation, meaning that the controller opens when the set temperature is exceeded.

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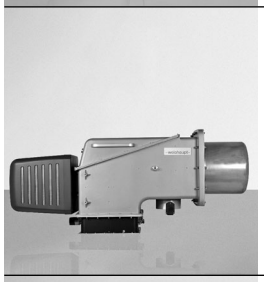

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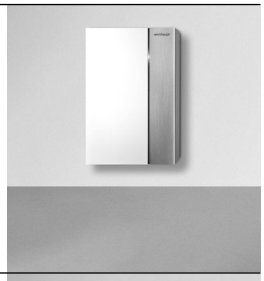

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