Service instructions

for contractors

Vitocal

WPR 300 heat pump control unit manual

For applicability, see the last page

VITOCAL

5366 335 GB 8/2008

Please keep safe.

Safety instructions

Please follow these safety instructions closely to prevent accidents and material losses.

Safety instructions explained

Danger
This symbol warns against the risk of injury.

Please note
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Target group

These instructions are exclusively designed for qualified personnel.
- Work on electrical equipment must only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.

Regulations

Observe the following when working on this system
- all legal instructions regarding the prevention of accidents,
- all legal instructions regarding environmental protection,
- the Code of Practice of relevant trade associations.
- all current safety regulations as defined by DIN, EN, DVGW, VDE and all locally applicable standards

Working on the system

- Isolate the system from the power supply and check that it is no longer 'live', e.g. by removing a separate fuse or by means of a main isolator.
- Safeguard the system against unauthorised reconnection.

Please note
Electronic modules can be damaged by electrostatic discharges.
Touch earthed objects, such as heating or water pipes, to discharge static loads.

Repair work

Please note
Repairing components that fulfil a safety function can compromise the safe operation of your heating system.
Replace faulty components only with original Viessmann spare parts.

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Safety instructions (cont.)

Ancillary components, spare and wearing parts

!

Please note
Spare and wearing parts that have not been tested together with the heating system can compromise its function. Installing non-authorised components and non-approved modifications or conversions can compromise safety and may invalidate our warranty. For replacements, use only original spare parts supplied or approved by Viessmann.

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Introduction

This manual explains the function, control parameters and fault messages of the WPR 300 heat pump control unit for Viessmann heat pumps.
With the control parameters, the heat pump can be matched to varying demands and operating conditions. To avoid incorrect operation of the heat pump or other system components, the control parameters and fault messages are available at three different setting levels.

Setting levels

- "System operator":
  Individuals who have been trained in the operation of the heating system by heating engineers (contractors).
- "Contractor":
  Heating engineers who have been trained the use of Viessmann heat pumps.
- "Expert":
  Heating engineers who have completed specialist expert training for Viessmann heat pumps.

Designation

After switching on, the setting level "System operator" is automatically enabled. Access to the "Contractor" and "Expert" levels is gained by entering an access code. Control parameters and fault messages which are only accessible at the "Contractor" and "Expert" setting levels, are indicated in this manual with the following symbols:

- Available at the "Contractor" and "Expert" setting levels. Control parameters are displayed as plain text.
- Only available at the "Expert" setting level. No plain text display; control parameters are identified by numbers.

Control parameters and fault messages at the "System operator" setting level have no special identification, since they are available without entering a code.

Note
All functions and settings are available at the "Expert" setting level. The "Contractor" level includes the "System operator" level.

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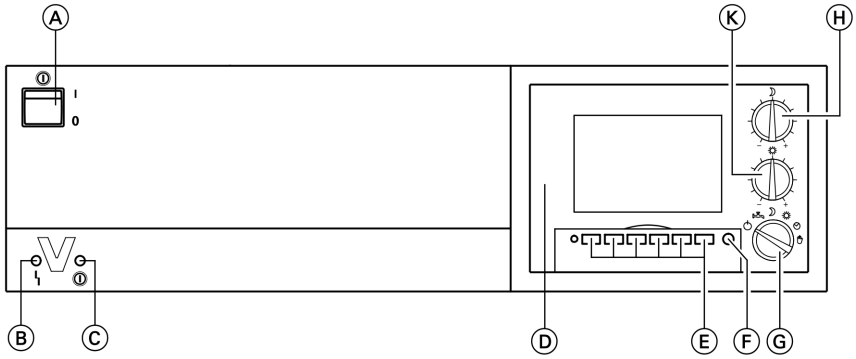
Introduction (cont.)

Displays and controls



Ⓐ ON/OFF switch
Ⓑ Fault indicator (red)
Ⓒ ON indicator (green)
Ⓓ Programming unit
Ⓔ Selection keys
Ⓕ "Standard display" key
Ⓖ Operating mode selector
Ⓗ Rotary selector "Reduced room temperature"
Ⓚ Rotary selector "Standard room temperature"

Enabling setting levels

Note
The functions of the "Contractor" and "Expert" setting levels assume specialist knowledge in relation to Viessmann heat pumps.
Our warranty becomes void if incorrect operation occurs at the "Contractor" or "Expert" setting level by the system operator or inadequately trained personnel.

1. Call up the main menu:
Press "Standard display".

2. Enter code:

Menu item
- **"Device settings"**
- **"Access rights"**
- Enter the code using the selection keys:
  5243 for "Contractor" setting level or
  3442541331 for "Expert" setting level
- 2 x **"OK"**

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Heat pump

The WPR 300 heat pump control unit is suitable for the following heat pumps:
- Vitocal 300-G, type BW, BWC, WW, WWC
- Vitocal 300-A, type AWC-I, AW-O

Different parameters are available in the control unit subject to type and equipment level. Parameters associated with a particular type are enabled via the coding card. Each compressor installed and each compressor level must be enabled individually (**"Enable"**, 5000, 5100).

Note
The compressor parameters have the numbers 5xxx, where 50xx describe the parameters of compressor stage 1, and 51xx describe the same parameters of compressor stage 2.

Starting and stopping the compressor

If one of the following conditions is met, the compressor **starts**:
- The flow temperature of the secondary circuit falls below (exceeds in active cooling mode; not for the Vitocal 300-A) the set flow temperature by more than **"Hysteresis secondary"** (7304).
- A heat demand is present via a heating water buffer cylinder, DHW cylinder or swimming pool.

In addition, the following conditions must be met at the same time:
- **"Start delay"** (5008) has expired.
- Min. return temperature **"Min. return temp."** (5002) has been exceeded.
- Temperature has fallen below the max. inlet temperature of the primary circuit **"Max. t primary inlet"** (5015) by **"Hysteresis primary"** (5004).
- Minimum inlet temperature of the primary circuit **"Min. t primary inlet"** (5016) has been exceeded by **"Hysteresis primary"** (5004).

At the beginning of the start delay, the primary pump starts, or the fan for air/water heat pumps. To create even, stable thermal conditions for reliable temperature capture, the secondary pump also starts.

Heat pump (cont.)

If the compressor does not start because of a fault, the control unit switches on other heat sources as available. Subject to the system configuration, these may be electric instantaneous heating water heaters or external heat sources, such as gas or oil fired boilers. Electric immersion heaters are available for DHW cylinders and heating water buffer cylinders.
If one of the following conditions is met, the compressor **stops** again:

- After **"Min. runtime"** (5005) there is no longer any heat demand, or the set flow temperature has been exceeded by **"Hysteresis secondary"** (7304).
- **"Max. flow temp"** (5001) or the **"Max. differential t"** (5011) have been exceeded.
- **"Max. t primary inlet"** (5015) has been exceeded.
- The temperature has fallen below **"Min. t primary inlet"** (5016).
- **"Max. high pressure"** (5022) has been exceeded (high pressure shutdown).
- The level has fallen below the **"Low pressure limit"** (5025) (low pressure shutdown).
- Power-OFF is enabled.
- The heat pump has a fault.

Frequently stopping and starting the heat pump increases wear on the compressor. Parameter **"Min. runtime"** (5005) prevents the heat pump shutting down within the specified time, during which the heat produced must be transferred to the consumers. Whether and under what conditions this "critical heat transfer" occurs can be established for every consumer individually (parameter **"Excess reaction"**, 2011, 600F, 7206). The "critical heat transfer" ends when the **"Min. runtime"** (5005) is reached. However, if a heat demand is still present, the compressor continues to run. Heat pumps with regulated output are set up to reach the optimum runtime **"Optimum runtime"** (500A) as frequently as possible.
After the compressor has shut down, the control unit prevents it restarting for the duration **"Min. pause"** (5006). This also applies if the compressor shut down because of a high pressure fault or after the maximum flow temperature **"Max. flow temp"** (5001) had been exceeded.

Compressor stage 2

For reasons of modularity, compressor stage 2 refers to a separate heat pump that is not equipped with its own control unit. Instead, it is fitted either with its own EEV controller or thermal expansion valve (TEV) to regulate the refrigerant circuit. If one of the following conditions is met, compressor stage 2 starts:

- The heating output required is greater than that of compressor stage 1.
- The integral comprising the duration and level of the set flow temperature deviation to the actual value in the secondary circuit exceeds the default value **"E heating threshold"** (730E).

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Heat pump (cont.)

For optimised starting and stopping of compressor stage 2, the heating outputs of the individual compressor stages must be known. This is specified with parameter **"Output"** (5030, 5130).

Refrigerant circuit

The operating conditions in the refrigerant circuit are generally influenced by the refrigerant flow rate of the electronic or thermal expansion valve (EEV, TEV).
For an electronic expansion valve, the valve position is regulated automatically by the EEV controller, whose control circuit works independently of the heat pump control unit. The EEV controller permanently communicates with the heat pump control unit via KM BUS. Via this, the heat pump control unit provides the EEV controller with set values, and receives the current values of the refrigerant circuit.
The EEV controller, if installed, also regulates the vapour injection (Enhanced Vapour Injection).

Note
*Under standard operating conditions, the refrigerant circuit is regulated to constantly superheat the suction gas. Under certain operating conditions, e. g. if the max. operating pressure of the evaporator (**"MOP limit"**, 501A) is reached, the controller switches over to pressurised regulation of the suction gas.*

For control of the refrigerant circuit, the following factors are taken into account:
- Conditions and limit defaults (parameters 5019 to 5027)
- Refrigerant parameters (stored in a non-volatile memory)
- Actual pressure and temperature values

The following pressure and temperature values are captured via sensors in the refrigerant and processed:
- Suction gas pressure
- Hot gas pressure
- Suction gas temperature
- Hot gas temperature
- Refrigerant temperature downstream of condenser
- Refrigerant temperature upstream of evaporator

The heat pump control unit also uses these values to calculate the amount of heat transferred, necessary for the refrigerant circuit statement. The power consumption of the compressor which is also required for this is calculated by the control unit from the stored output curves. The selection within the control unit of the curve that matches the compressor is made via parameter **"Output"** (5030, 5130).

Heat pump (cont.)

To assess the efficiency, the power consumption calculated for the compressor can be compared with the total heat pump consumption for the same period.*1The electricity meter on site provides the total power consumption. If there is a large difference between the two output values, this indicates that the heat pump is not optimally matched to the other electrical heat sources, e.g. instantaneous heating water heater. In this case, the runtimes and start criteria for these electrical consumers must first be checked.

If the runtimes of electrical heat sources are too long in spite of optimum matching, the following must be checked more closely:

- Primary and secondary flow rates
- Refrigerant circuit function
- Heat exchanger
- Extended control parameters

Seasonal performance factor (SPF)

The control unit calculates the seasonal performance factor of the compressor, using the ratio of transferred heating energy to the electrical energy consumption for the last 12 months. The current month is not included in this statement.

For the seasonal performance factor which is comparable to the design value according to VDI 4650, the power consumption of the secondary pumps and fan (type AW) must be calculated from the data of the type plate and hours run (see statistics), and added to the power consumption of the compressor.

Scanning statistics
Operating instructions

Defrosting

For air/water heat pumps, the evaporator must be defrosted under certain outside air conditions. The heat pump control unit starts this process automatically. The defrost conditions can be adjusted using the following parameters:

- Max. time for defrosting the evaporator (**"Defrost time"**, 500B)
- Time delay; the defrost process starts at the latest after this (**"Max. defrost start time"**, 500C)
- Blocking time for repeat defrost (**"Defrost OFF time"**, 500D)

*1 *For this, also observe the runtimes (hours run) of the actuators such as pumps etc.*

Heat pump (cont.)

- Temperature differential for the start of the defrost process (**"Temp. diff. defrost"**, 500E)
- Evaporator temperature for the start of the defrost process (**"Defrost start t"**, 500F)
- Max. evaporator temperature (**"Defrost stop t"**, 5010).

Lag heat pumps

The heat pump control unit in the lead appliance can regulate up to four lag heat pumps, subject to connection method. Parameter **"No. of ext. heat p"** (5735) indicates the number.

Parameter **"Cascade control"** (700A) determines whether the lag heat pumps are connected to each other via external extension H1 or via LON. The lag heat pumps are identified for communication via LON by allocating them a unique number (**"Number of heat pumps"**, 5707). For the address within the LON, a system and subscriber number is additionally allocated.

Note
For heat pump cascades via LON, the lead appliance must have the LON communication module for heat pump cascades installed.

For a heat pump cascade, the following parameters in lead and lag heat pumps must be set in accordance with the following table.

Parameter	Setting	
	Lead appliance	**Lag heat pump**
"Cascade control", 700A	1 or 2	0
"No. of ext. heat p", 5735	1 to 3 (H1) 1 to 4 (LON)	0
"System diagram", 7000	0 to 10	11

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Lag heat pumps (cont.)

Lag heat pumps are hydraulically controlled in a cascade, which supplies the heating circuits directly or via a heating water buffer cylinder. If DHW should be able to be heated with all heat pumps, the three-way diverter valve "Central/DHW heating" must be installed at the corresponding point downstream of the cascade. The control unit enables hook-up of the lag heat pumps for DHW heating via parameter **"Ext.heat p for DHW"** (700E). For this, either all or no lag heat pumps can be used. Subject to the hydraulic connection, either the three-way diverter valve "central/DHW heating" or the circulation pumps for cylinder heating of the lag heat pumps must be connected electrically to be able to start and stop simultaneously in case of heat demand.

Lag heat pumps can be enabled via parameter **"Priority ext. demand"** (7019) for swimming pool heating.
If one of the following conditions is met, the lag heat pumps start:

- The heating output required, e.g. by a heating water buffer cylinder, is greater than that of the lead appliance.
- The integral comprising the duration and level of the set flow temperature deviation to the actual value in the secondary circuit exceeds the default value **"E heating threshold"** (730E).

External heat source

The heat pump control unit enables the heat pump to operate in dual-mode with an external heat source, e.g. oil fired boiler (**"Ext. heat source"**, 7B00).

The external heat source is hydraulically connected to let the heat pump also be used as a return temperature raising facility for the boiler. In this case, system separation is provided with a low loss header or heating water buffer cylinder.
For optimum heat pump operation, the external heat source must be integrated via a mixer in the heating water flow. A quick reaction is achieved by directly controlling this mixer via the heat pump control unit.

If an instantaneous heating water heater is installed in the secondary circuit flow, priority can be set for the external heat source (**"Priority"**, 7B01).
The heat pump control unit starts the external heat source if the following conditions are met simultaneously:

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External heat source (cont.)

- The outside temperature (long-term average) is below the **"Dual-mode temp"** (7B02).
- The actual value for **"Threshold"** (7B03) exceeds the set value. Following matching of the set flow temperature in the secondary circuit, this actual value is not calculated in the **"Delay"** (7B04). This occurs e. g. after changing the operating mode "Standard"/"Reduced" or after switching "Central heating"/"DHW heating".

Note
In case of direct heat demand from the consumers, e.g. for frost protection or if the heat pump is faulty, the external heat source is also started above the dual-mode temperature.

Subject to the setting of parameter **"Dual-mode temp"** (7B0E), solo operation of the external heat source is also possible.

If, after starting, the flow temperature in the circuit of the external heat source reaches the temperature **"Mixer t limit"** (7B05), the mixer opens and regulates the system flow temperature to the set value. The characteristics of the mixer can be matched with regard to hysteresis limits and runtime (parameters 7B08, 7B09, 7B0A, 7B0B). If the opening temperature of the mixer has still not been reached two hours after starting the external heat source, a fault message is displayed on the heat pump control unit.
The heat pump control unit stops the external heat source if the following conditions are met:

- The **"Min. runtime"** (7B06) of the external heat source is reached.
- For the duration **"Runtime without demand"** (7B07), the system flow temperature is above the set flow temperature.

The heat pump control unit does not contain any safety function for the external heat source. To prevent temperatures that are too high in the heat pump flow and return in case of a fault, high limit safety cut-outs must be provided to stop the external heat source (switching threshold 65 °C).

DHW cylinders

Types and configuration

The DHW cylinder is enabled together with the system diagram. Diagrams with even numbers have a DHW cylinder.

DHW cylinders (cont.)

Cylinders with an internal indirect coil ("coil heat exchanger"), external heat exchanger (cylinder primary system) and cylinders with jacket heat exchangers can be used. Due to the low heat transfer output, cylinders with jacket heat exchangers and conventional cylinders with an internal indirect coil are only suitable for operation with heat pumps.
We therefore recommend using only cylinders with a very large heat transfer surface that are built especially for heat pumps, or a correspondingly sized cylinder primary system. Heat exchangers should be sized to 2 to 3 K temperature differential between the primary and secondary side. External heat exchangers must be operated in countercurrent.

Note
3 K additional differential between the heating water flow temperature and cylinder temperature reduce the efficiency of the heat pump by 10%.

A second, lower cylinder temperature sensor can be installed in some DHW cylinders. This sensor is enabled via parameter **"Second temperature sensor"** (600E). With this sensor, the cylinder volume can be better utilised in operating modes (6001) **"Standard"** and **"Second temperature"**, as well as for functions **"Start optimisation"** (6009) and **"Stop optimisation"** (600A).

Heating

In the delivered condition, DHW heating has priority over the heating circuits. If required, this can be changed with parameter **"DHW priority"** (6010). As soon as a heat demand is present from the heating circuits and the DHW cylinder simultaneously, for DHW priority the cylinder is only heated for a duration of **"Max. runtime"** (6011). If a heat demand is still present at the DHW cylinder, the heating circuit is only supplied for a duration of **"Max. DHW break"** (6012).

For effective cylinder heating, the DHW in the DHW cylinder should not be mixed during this process. For this reason, the control unit stops the DHW circulation pump until the cylinder temperature reaches the second set temperature (**"Set temp. 2"**, 600C) up to 50% of its hysteresis (**"Hysteresis"**, 6007).

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DHW cylinders (cont.)

For cylinder primary systems, mixing of the cylinder water and cooling of the return is prevented, because the cylinder primary pump only starts when the flow time of the secondary pump (**"Start delay"**, 5008) is reached and the heat pump produces heating output. In the flow time, an on-site shut-off valve in the DHW line can additionally be closed via the cylinder primary pump relay, and subsequently reopened.

Operating modes

Various operating modes can be selected for the DHW cylinder, which are differentiated by different set temperatures and different start and stop criteria. Subject to the way the operating mode is selected (**"Operating mode"**, 6004), the selection is made by the position of the operating mode selector, the stage selected for DHW heating (**"Switching times DHW"**, 6001), the external operating mode changeover or by remote control.

- **"Off"**
  The set cylinder temperature is **"Min. temp."** (6005). Heating is started and stopped via the top cylinder temperature sensor.
- **"Top"**
  The set cylinder temperature is **"Set DHW temp."** (6000). Heating is started and stopped via the top cylinder temperature sensor.
- **"Standard"**
  The set cylinder temperature is **"Set DHW temp."** (6000). Heating is started via the top cylinder temperature sensor. To stop heating, the control unit uses the bottom sensor (if installed), or otherwise also the top one.
- **"Second temperature"**
  The set cylinder temperature is **"Set temp. 2"** (600C). Heating is started via the top cylinder temperature sensor. To stop heating, the control unit uses the bottom sensor (if installed), or otherwise also the top one.

The cylinder demands heating in all operating modes when the current temperature at the start sensor falls below the set value by more than **"Hysteresis"** (6007). If the temperature at the stop sensor rises above the set value, or as soon as **"Max. temp"** (6006) is reached, cylinder heating is stopped.

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DHW cylinders (cont.)

Booster heaters

Booster heaters, e.g. an immersion heater, external heat source or instantaneous heating water heater can be used for DHW heating. The control unit enables the individual appliances for DHW heating with the following parameters:

- Immersion heater:
  Parameters **"Booster heater"** (6014) and **"DHW with e heating"** (6015) must be set to **"Yes"**.
- External heat source:
  Parameters **"Booster heater"** (6014) and **"Ext. HS for DHW"** (7B0D) must be set to **"Yes"**.
- Instantaneous heating water heater:
  Parameters **"Inst.htg.water heat"** (7900) and **"DHW with e heating"** (6015) must be set to **"Yes"**.

The integral load manager in the heat pump control unit decides which heat sources to use for DHW heating. Generally the external heat source has priority over the electric heaters.
If one of the following criteria is met, the booster heaters begin cylinder heating:

- Cylinder temperature is below 3 °C (frost protection).
- Heat pump does not provide any heating output and temperature has fallen below set temperature at the top cylinder temperature sensor by more than **"Hyst. booster heater"** (6008).
- Expected temperature rise (**"T rise / hour"**, 600D) is not reached by heating with the heat pump.
  The expected temperature rise is calculated as follows:

$$\Delta T_{bst} = t_{heat} \cdot S_{STS} + \vartheta_{KW}$$

ΔT_{bst} Expected temperature rise through booster heater
t_{heat} Current cylinder heating runtime
S_{STS} Temperature rise per hour **"T rise / hour"** (600D)
ϑ_{KW} Cold water temperature (standard value 20 °C)

Please note that some booster heaters are only regulated by the top temperature sensor. The immersion heater in the DHW cylinder and the external heat exchanger stop as soon as the set value at the top temperature sensor is reached, minus a hysteresis of -1 K.

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DHW cylinders (cont.)

Frost protection

As soon as the temperature at the top cylinder temperature sensor drops below 3 °C, the heat pump control unit switches the DHW cylinder into frost protection mode. This is independent of the set temperatures of the different operating modes. All available heat sources that are enabled in the heat pump control unit are used. A possible block for heating with an immersion heater (**"DHW with e heating"**, 6015) does not take effect. If the temperature at the top cylinder temperature sensor exceeds 10 °C, frost protection mode ends.

DHW heating only once

The operator enables DHW heating only once via the control unit. DHW cylinders with two temperature sensors are then heated to set temperature **"Set DHW temp."** (6000). Cylinders with only one temperature sensor are heated to **"Set temp. 2"** (600C). The heat demand is automatically deleted when the set temperature has been reached.

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DHW cylinders (cont.)

DHW auxiliary function

By regularly heating the DHW cylinder, the auxiliary function (**"Auxiliary function"**, 600B) offers effective protection from possible bacteria. For this, the total contents of the DHW cylinder are heated to **"Set temp. 2"** (600C) during the first DHW heating on a Monday. As soon as this temperature reaches 50% of it hysteresis (**"Hysteresis"**, 6007), the DHW circulation pump (if installed) starts.

Power-OFF

No DHW is heated during power-OFF. If the start criteria for DHW heating are still met after the end of power-OFF, cylinder heating will continue.

Start and stop optimisation

The start optimisation ensures that the DHW cylinder has already reached the selected set temperature at the beginning of the first switching time. The stop optimisation ensures that the DHW cylinder is always fully heated for selected switching times at the end of "Standard" operating mode.
For this, DHW heating must start within a specific period before the selected switching times. The control unit calculates the heat-up time required for this from the current cylinder temperature and parameter **"T rise / hour"** (600D):

$$t_{heat} = (\vartheta_{STS,\,set} - \vartheta_{STS}) / S_{STS}$$

t_{heat} Heat-up time
$\vartheta_{STS,\,set}$ Set DHW temperature
ϑ_{STS} Actual DHW temperature
S_{STS} Temperature rise per hour **"T rise / hour"** (600D)

Example:
The stop optimisation is particularly helpful for combinations of heat pump and solar thermal system. With the correct setting, this function ensures that the DHW cylinder is always fully heated at a specific time in the evening. For heating exclusively via the solar thermal system, cylinder reheating during the day can be largely suppressed, e.g. by starting "Reduced" operating mode and a lower set temperature.

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DHW cylinders (cont.)

Forced heat transfer

Minimum compressor runtimes increase the efficiency and protect the components of the heat pump. Surplus heat can be transferred to the consumers, as soon as they receive a "transfer signal" from the control unit. Parameter **"Excess reaction"** (600F) determines whether and under what conditions the DHW cylinder absorbs the surplus heat.

The forced heat transfer also ends when **"Max. temp"** (6006) is reached.

Instantaneous heating water heater

An electric instantaneous heating water heater can be integrated in the heating water flow as an auxiliary heat source. Control via the heat pump control unit is enabled with parameter **"Inst.htg.water heat"** (7900).

The system operator can enable the instantaneous heating water heater separately for central heating (**"Electric heating"**, 7902) or for DHW heating (**"DHW with e heating"**, 6015).
If **one** of the following conditions is met, the heat pump control unit starts the instantaneous heating water heater:

- A direct heat demand is present, e. g. from a consumer for frost protection.
- The actual value for **"E heating threshold"** (730E) exceeds the set value. Following matching of the set flow temperature in the secondary circuit, this actual value is not calculated in the **"Heater rod delay"** (7905). This occurs e.g. after changing the operating mode "Standard"/"Reduced" or after switching "Central heating"/"DHW heating".

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Instantaneous heating water heater (cont.)

If enabled via parameter **"Max. e heating stage"** (7907), the control unit starts stages 1, 2 or 3 of the instantaneous heating water heater, subject to heat demand. As soon as the maximum flow temperature in the secondary circuit **"Max. flow temp"** (7904) is reached, the control unit stops the instantaneous heating water heater.
Parameter **"Stage at power-OFF"** (790A) restricts the output stage of the instantaneous heating water heater for the duration of the power-OFF. To be able to cover the heat demand more quickly after a longer power failure, the instantaneous heating water heater can also be started in addition to the heat pump (**"Stage power failure"**, 7909). This occurs after an adjustable delay (**"Blocking time, power failure"**, 7908). The maximum output stage after a power failure is specified by parameter **"Stage power failure"** (7909).

To limit the total power consumption, the control unit stops the instantaneous heating water heater for a few seconds directly before the compressor starts. Each stage is subsequently started individually one after the other in intervals of 10 s.
If the instantaneous heating water heater is on and the differential between flow and return temperature in the secondary circuit does not rise to at least 1 K within 24 h, the control unit displays a fault message (requirement: **"Inst.htg.water heat"**, 7900 is set to **"Yes"**).

Heating water buffer cylinder

Types and configuration

Heating water buffer cylinders are required under the following conditions in systems with heat pumps:
- Several heating circuits installed.
- Heating circuits with mixer installed.
- Power-OFF periods must be bypassed.

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Heating water buffer cylinder (cont.)

For system diagrams 3 to 10, the heating water buffer cylinder is configured automatically, since it is a constant default here. For diagrams 1 and 2, a heating water buffer cylinder can be selected as an option via parameter **"Buffer cylinder"** (7200).


System examples - heat pumps

Heating water buffer cylinders must have two connections each for charging and discharging. If these connections are arranged on one side one above the other, we recommend connecting the charge circuit to the bottom one and the discharge circuit to the top one. The flow rate through the heat pump in the charge circuit must be greater than that of the discharge circuit.

In contrast to the heating circuits, the heating water buffer cylinder is regulated by output and not temperature. With a direct output demand, the management of different heat sources, such as cascades, is more effective than calculating the time integral from the set and actual temperatures.
The heat pump control unit treats a low loss header like a small heating water buffer cylinder. Therefore, a corresponding system diagram must also be selected when using a low loss header, or the header must be enabled via parameter **"Buffer cylinder"** (7200).
With a low loss header, in order for the volume of the heating circuits to be able to be used as a buffer, the flow rate of the charge circuit must be lower than the flow rate to the heating circuits.

Operating modes

Various operating modes can be selected for the heating water buffer cylinder, which are differentiated by different set temperatures and different start and stop criteria. For the operating modes of the heating water buffer cylinder, different start and stop times can be specified via parameter **"Switch t buffer cyl."** (7201).

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Heating water buffer cylinder (cont.)

- **"Off"**
  In "Standby" mode, the control unit monitors the frost protection of the heating water buffer cylinder. If the temperature at the cylinder temperature sensor drops below 3 °C, heating is carried out with all available heat sources. Along with the heat pump, the control unit also then immediately starts the instantaneous heating water heater and external heat sources. This occurs independently of the value selected at parameter **"Electric heating"** (7902). In this operating mode, as soon as the temperature in the heating water buffer cylinder exceeds 10 °C, frost protection heating ends.
- **"Standard" and "Reduced"**
  The temperature at the cylinder temperature sensor is used for the heat demand. The set cylinder temperature is the maximum value of all heating circuit set temperatures. If the cylinder temperature falls below the set value by more than **"Hysteresis"** (7203), heating of the heating water buffer cylinder starts.
  In "Standard" operating mode, heating ends as soon as the return temperature exceeds the set temperature given above. In "Reduced" operating mode, the temperature sensor in either the buffer cylinder or the return is used to stop the heat pump, depending which shows the higher value.
  Parameter **"Max. temp"** (7204) specifies the maximum temperature in the heating water buffer cylinder.
- **"Fixed value"**
  The set temperature of the heating water buffer cylinder is **"Fixed temp."** (7202). If the temperature in the heating water buffer cylinder falls below the set value by the **"Hysteresis"** (7203), heating of the heating water buffer cylinder starts. This ends as soon as the fixed temperature at the return temperature sensor of the heat pump is exceeded.

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Heating water buffer cylinder (cont.)

Demand of further heat sources

Under certain conditions, to heat the heating water buffer cylinder, the control unit issues a demand to other heat sources as well as the heat pump. For this, the following criteria must be met:

- If the heat pump does not deliver any heating output, and the current temperature in the heating water buffer cylinder has fallen below the set value by **"Hysteresis"** (7203), heating is immediately carried out by one of the following heat sources:
  – External heat source:
    Enabling only if the outside temperature is below the dual-mode temperature (**"Dual-mode temp"**, 7B02).
  – Instantaneous heating water heater:
    Parameter **"Heating with electro"** (7902) must be set to **"Yes"**.
- If the temperature in the instantaneous heating water heater has fallen below the set temperature by twice the hysteresis, the control unit starts further heat sources one after the other, after a delay.

Heating with other heat sources ends when the set temperature in the heating water buffer cylinder is reached.

Stop optimisation

The stop optimisation ensures that the heating water buffer cylinder is always heated to the set temperature for enabled switching times at the end of a "higher" operating mode.

For this, heating of the heating water buffer cylinder must start within a specific period before the selected switching times. The heat-up time is automatically selected in a range between 0.5 and 2 h, subject to the times required for it on previous days.

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Heating water buffer cylinder (cont.)

Forced heat transfer

Minimum compressor runtimes increase the efficiency and protect the components of the heat pump. Surplus heat can be transferred to the consumers, as soon as they receive a "transfer signal" from the control unit. Parameter **"Excess reaction"** (7206) determines whether and under what conditions the heating water buffer cylinder absorbs the surplus heat.

The forced heat transfer for the heating water buffer cylinder is ended as soon as the temperature in the cylinder or the return temperature exceeds the **"Max. temp"** (7204).

Heating circuit

Types and configuration

The heat pump control unit can control one heating circuit without mixer and two heating circuits with mixer. A heating water buffer cylinder is required for systems with several heating circuits or only one heating circuit with mixer.

Parameters with the numbers 2xxx always relate to the first heating circuit, whereas the numbers 3xxx and 4xxx describe the identical parameters of the second and third heating circuits.

As heat demands, the heat sources receive the maximum value of the demands from all heating circuits. Heating circuits without mixer may therefore be supplied with a higher flow temperature than required. If heating and cooling demands occur simultaneously, heating operation is given priority.

Operating modes

The operating modes of the heating circuits result from the position of the operating mode selector, the external demand, the switching times (**"Switching times HC"**, 2002), the remote control and parameter **"Operating mode"** (2004).

The operating mode can be defined separately for each heating circuit.

Heating circuit (cont.)

Subject to the outside temperature, the control unit switches between heating, cooling and frost protection mode. For heating and cooling mode, the start and stop limits required here can be set as differentials to the current set room temperature.

- Heating limit:
  Set room temperature – **"Temp. diff. heating"** (7003)
- Cooling limit:
  Set room temperature + **"Temp. diff. cooling"** (7004)
- Frost limit:
  Value of parameter **"Frost protection t"** (7006)

Fixed hystereses are programmed to prevent brief fluctuations around these limits from resulting in continual changeover between heating and cooling mode. Furthermore, the control unit uses the long-term average outside temperature for changeover. The averaging interval (period for calculating the long-term average) can be set with parameter **"Ave. time outside t"** (7002).
For frost protection, it is safer to also take account of short-term fluctuations. Therefore, to start and stop the frost protection function, the control unit uses the short-term average outside temperature, whose averaging interval is permanently set inside the control unit to 2 min. The diagram shows the conditions for heating, cooling and frost protection mode, subject to outside temperature.

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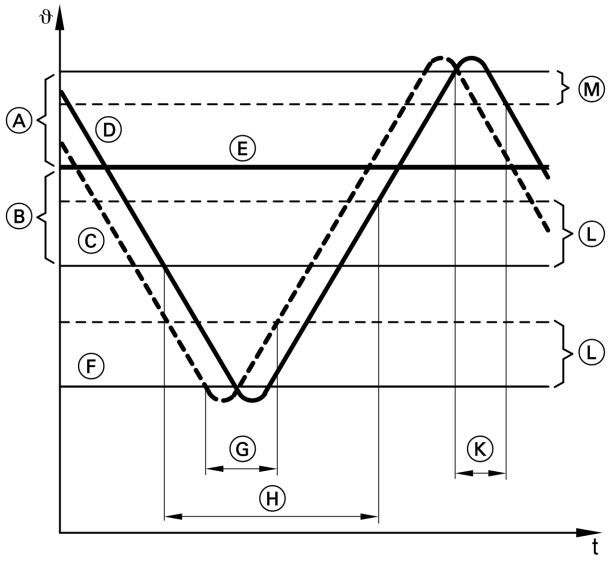
Heating circuit (cont.)



Ⓐ Temperature differential for calculating the cooling limit (**"Temp. diff. cooling"**, 7004)
Ⓑ Temperature differential for calculating the heating limit (**"Temp. diff. heating"**, 7003)
Ⓒ Outside temperature (short-term average, 2 min)
Ⓓ Outside temperature (long-term average, **"Ave. time outside t"**, 7002)
Ⓔ Set room temperature (adjustable via rotary selector ☼ or ☽)
Ⓕ Frost limit (**"Frost protection t"**, 7006)
Ⓖ Frost protection mode enabled
Ⓗ Heating mode enabled
Ⓚ Cooling mode enabled
Ⓛ Fixed hysteresis 2 K
Ⓜ Fixed hysteresis 1 K

If a room temperature sensor is installed, a short-term average with a fixed averaging interval of 2 min is also available for the room temperature. The control unit uses this value for room hook-up with weather-compensated control or for room temperature-dependent control.

In both cases, the room is only heated until the current room temperature exceeds the value for **"Room t standard"** (2000) by **"Room t excess"** (2012).

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Heating circuit (cont.)

"Standby operating mode"

In "Standby" operating mode, heating is carried out if **one** of the following criteria is met:

- Short-term average outside temperature falls below the limit **"Frost protection t"** (7006).
- Room temperature (if room temperature sensor enabled, parameter **"Remote control"**, 2003 set to **"Yes"**) falls below 5 °C.
- System flow temperature falls below 5 °C.

For frost protection the heating circuit pump is started, or for direct heating circuits the secondary pump.
Heating in frost protection mode ends if **all** the following criteria are met:

- Short-term average outside temperature exceeds the limit **"Frost protection t"** (7006) by at least 2 K.
- Room temperature (if room temperature sensor enabled, parameter **"Remote control"**, 2003 set to **"Yes"**) exceeds 7 °C.
- System flow temperature exceeds 15 °C.

There is no cooling mode in "Standby" operating mode.
To prevent the pumps from seizing up during prolonged idle periods, the heat pump control unit starts all directly controlled pumps daily at 13:00 h for 10 s (pump kick).

"Standard" and "Reduced" operating mode

In "Standard" and "Reduced" operating modes, heating and cooling output are subject to either weather-compensated control according to the heating or cooling curve, or room temperature-dependent control. In the second case, a room temperature sensor must be installed and enabled (parameter **"Remote control"**, 2003 set to **"Yes"**).

Note
Cooling mode in the heating circuit is generally only carried out in "Standard" and "Fixed value" operating modes. For more information regarding cooling mode, see page 35.

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Heating circuit (cont.)

Weather-compensated control

In weather-compensated heating mode, the set flow temperature in both operating modes is calculated from the relevant set room temperature **"Room t standard"** (2000) or **"Room t reduced"** (2001), and the current outside temperature (long-term average) according to the heating curve. Its level (**"Heating curve level"**, 2006) and slope (**"Heat. curve slope"**, 2007) are adjustable.
The set flow temperature is calculated from the heating curve as follows:

$$\vartheta_{VL,set} = \vartheta_{RTS,set} + \Delta T_{HKL} - [S_{HKL} \cdot \Delta T_{ATS/RTS} \cdot (1.149 + 0.021 \cdot \Delta T_{ATS/RTS} + 0.00025 \cdot \Delta T^2_{ATS/RTS})] + \Delta T_{RE} + \Delta T_{VL}$$

$\vartheta_{VL,set}$ Set flow temperature
$\vartheta_{RTS,set}$ Set room temperature
ΔT_{HKL} Heating curve level
S_{HKL} Heating curve slope
$\Delta T_{ATS/RTS}$ Room temperature - outside temperature differential (long-term average)
ΔT_{RE} Room influence
ΔT_{VL} Excess flow temperature

The excess set flow temperature at **"Flow t excess"** (2014) serves to balance small leaks at the mixer.

Room influence
If a room temperature sensor is installed, parameter **"Room t hook-up"** (200B) enables room influence. The strength of the influence is specified by parameter **"Room t hook-up slope"** (200A).

$$\Delta T_{RE} = (\vartheta_{VL,set} - \vartheta_{RTS}) \cdot S_{RE}$$

ΔT_{RE} Room influence
$\vartheta_{VL,set}$ Set flow temperature
ϑ_{RTS} Room temperature (average over time)
S_{RE} Room influence slope

The room influence is restricted to **"Max. flow corr."** (200D).

Room temperature-dependent control

The set flow temperature for room temperature-dependent control is calculated from the differential of the set and actual room temperature. The control characteristics follow an integral controller. With parameter **"Integral room thermostat"** (2009), the integral proportion can be altered separately for the individual heating circuits, and with this, the reaction time of the control circuit.

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Heating circuit (cont.)

Max. flow temperature

The maximum possible set flow temperature for both weather-compensated and room temperature-dependent control is specified by parameter **"Max. flow temp."** (200E).

Temperature control

Heating circuits with mixer are regulated directly to the set flow temperature.
The limited modulation ability of heat pumps means the return temperature is used for control of the secondary circuit and with this, for all direct heating circuits. The set return temperature is calculated from the set flow temperature minus a fixed spread of 5 K.

$\vartheta_{RL,\,set} = \vartheta_{VL,\,set} - 5\ K$
$\vartheta_{VL,\,set}$ Set flow temperature
$\vartheta_{RL,\,set}$ Set return temperature
Direct heating circuits use a slightly different curve, so that the set return temperature does not fall below the set room temperature near the heating limit (low value for $\Delta T_{ATS/RTS}$).

Limitations of the operating mode

Subject to the outside temperature (long-term average), the operating mode does not change from "Standard" to "Reduced" under all conditions, in accordance with EN 12831. The control unit prevents this changeover below the limit **"Red.mode t threshold"** (7005). If the outside temperature rises 2 K above this limit, the control unit re-enables "Reduced" operating mode.

"Fixed value" operating mode

In "Fixed value" operating mode, the room is heated with the maximum flow temperature. This is adjustable via parameter **"Max. flow temp"** (200E).

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Heating circuit (cont.)

Demand of further heat sources

Under certain conditions, the control unit issues a demand to other heat sources as well as the heat pump, e. g. in frost protection mode. In this case, the control unit immediately starts an external heat source plus an instantaneous heating water heater, independent of parameters **"Electric heating"** (7902) and **"Dual-mode temp"** (7B02).
Alongside frost protection, the control unit issues a demand to further heat sources if the following criteria are met **simultaneously**:

- Heating circuit flow temperature remains below the set flow temperature for more than 4 h.
- With room influence enabled, room temperature is more than 0.5 K below the set value.
- Heat source is enabled:
  - Instantaneous heating water heater:
    Parameter **"Heating with electro"** (7902) is set to **"Yes"**.
  - External heat source:
    Parameter **"Ext. heat source"** (7B00) is set to **"Yes"** and temperature is below dual-mode temperature.

The control unit does not issue a demand to other heat sources if **one** of the following criteria is met.

- Heat source is not enabled:
  - Instantaneous heating water heater:
    Parameter **"Heating with electro"** (7902) is set to **"No"**.
  - External heat source:
    Parameter **"Ext. heat source"** (7B00) is set to **"No"** and dual-mode temperature is exceeded.
- Heating circuit flow temperature exceeds the set flow temperature.
- With room influence enabled, room temperature is more than 0.5 K above the set value.

Note
During power-OFF, only the heating circuits connected to the heating water buffer cylinder continue to be supplied. Frost protection is available for the remaining heating circuits.

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Heating circuit (cont.)

Forced heat transfer

Minimum compressor runtimes increase the efficiency and protect the components of the heat pump. Surplus heat can be transferred to the consumers, as soon as they receive a "transfer signal" from the control unit. Parameter **"Excess reaction"** (2011) determines whether and under what conditions the heating circuit absorbs the surplus heat.

Note
*The forced heat transfer for one heating circuit ends as soon as the maximum flow temperature **"Max. flow temp"** (200E) is reached. For room temperature-dependent control, the limit for forced heat transfer is calculated by adding **"Room t standard"** (2000) and **"Room t excess"** (2012).*

Mixer

The mixer is motor-controlled either directly by the heat pump control unit with 230 V (M2) or via KM BUS (M3). The following parameters are available to match the mixer characteristics to the properties of the heating system:

- **"Flow t excess"**, 2014
- **"Mixer runtime"**, 2015
- **"Mixer active zone"**, 2018
- **"Mixer dead zone"**, 2019

Note
For software reasons, the parameters in the control unit are available for all heating circuits, including those without mixer. Parameters 2014, 2015, 2018 and 2019 can be specified for the direct heating circuit, but have no effect.

Note
Parameters 2015, 2018 and 2019 have no influence on mixer motors which are controlled via KM BUS.

Cooling mode in cooling or heating circuit

Types and configuration

Cooling mode is possible either with one of the heating circuits installed, or with a separate cooling circuit, e.g. chilled ceilings or fan convectors. This can be adjusted in the control unit with parameter **"Cooling circuit"** (7101).

Note
Cooling mode is not possible with air/water heat pumps (type AW).

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Cooling mode in cooling or heating circuit (cont.)

The system diagrams for cooling mode are hydraulically sized so the cooling energy can directly reach the heating or cooling circuit. Heating water buffer cylinders are generally bypassed, since they are often unsuitable for cooling mode. Furthermore, heating mode is possible through this in one or several heating circuits, while cooling mode is applied simultaneously to the other heating circuits or separate cooling circuit.
Subject to system version and accessories (AC or NC-Box), natural cooling, optionally with or without mixer, or active cooling is possible. For natural cooling, the compressor is shut down and heat exchange occurs directly with the primary circuit. Active cooling uses the heat pump as a refrigeration unit. Parameter **"Cooling"** (7100) specifies the type of cooling mode. Active cooling is only possible outside a power-OFF period, and must be enabled separately by the system operator.

Enabling cooling mode
Operating instructions

Note
*For active cooling, a room temperature sensor must be installed and enabled (parameter **"Remote control"**, 2003 set to **"Yes"**).*

Even if the AC-Box is installed and active cooling is selected and enabled, the control unit will initially start the natural cooling function. The compressor does not start unless the set room temperature cannot be reached in this way for a prolonged period, or is exceeded by twice the hysteresis (**"Room t hyster.cool"**, 7107). The DHW cylinder initially absorbs the heat produced in this way, until it has reached a temperature of 50 °C. The heat is then transferred to the primary circuit.
A mixer can only be used with natural cooling, and particularly in cooling mode on underfloor heating circuits, it keeps the flow temperature above the dew point. To ensure the transfer of the high cooling output in active cooling at all times, no mixer is provided for this. Subject to system diagram, the primary pump may have to run as well in natural cooling or active cooling.

Operating modes

Cooling mode in the heating circuits is carried out in "Standard" and "Fixed value" operating modes. The separate cooling circuit is additionally cooled in "Reduced" and "DHW only" operating modes. The latter enables continuous cooling of a room, e.g. a warehouse during the summer months.

The cooling output is subject to either weather-compensated control according to the heating or cooling curve, or room temperature-dependent control.

Cooling mode in cooling or heating circuit (cont.)

Note
*For cooling mode in the following cases, a room temperature sensor must be installed and enabled (parameter **"Remote control"**, 2003 set to **"Yes"**):*
- *Weather-compensated cooling mode with room influence*
- *Room temperature-dependent cooling mode*
- *Separate cooling circuit*

Weather-compensated control

In weather-compensated cooling mode, the set flow temperature is calculated from the relevant set room temperature and the current outside temperature (long-term average) according to the cooling curve. Its level (**"Cooling curve level"**, 7110) and slope (**"Cooling curve slope"**, 7111) are adjustable. The set flow temperature is calculated from the cooling curve as follows:

$$\vartheta_{VL,\,set} = \vartheta_{RTS,\,set} + \Delta T_{KKL} + S_{KKL} \cdot \Delta T_{ATS/RTS} + \Delta T_{RE}$$

$\vartheta_{VL,\,set}$ Set flow temperature
$\vartheta_{RTS,\,set}$ Set room temperature
ΔT_{KKL} Cooling curve level
S_{KKL} Cooling curve slope
$\Delta T_{ATS/RTS}$ Room temperature - outside temperature differential (long-term average)
ΔT_{RE} Room influence

Room influence
Parameter **"Room t hook-up slope"** (7104) specifies the strength of the room influence for cooling mode. The room influence is calculated as follows:

$$\Delta T_{RE} = (\vartheta_{RTS,\,set} - \vartheta_{RTS}) \cdot S_{RE}$$

ΔT_{RE} Room influence
$\vartheta_{RTS,\,set}$ Set room temperature
ϑ_{RTS} Room temperature (2-minute average over time)
S_{RE} Room influence slope (**"Room t hook-up slope"**, 200A, 7104)

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Cooling mode in cooling or heating circuit (cont.)

Room temperature-dependent control

Parameter **"Room control"** (7105) enables room temperature-dependent control for cooling mode. The set flow temperature is calculated from the differential of the set and actual room temperature. The control characteristics follow an integral controller. Parameter **"Integral room thermostat"** (7108) changes the integral proportion and with it, the reaction time of the control unit.

"Standard" operating mode

The cooling output for the heating circuits is subject to either weather-compensated control according to the cooling curve, or room temperature-dependent control.

Min. flow temperature

The calculated set flow temperatures for both weather-compensated and room temperature-dependent control are limited to the minimum value **"Min. flow temp."** (7103).

"Fixed value" operating mode

In "Fixed value" operating mode, the room is cooled with the minimum flow temperature **"Min. flow temp."** (7103).

Cooling mode for room temperature-dependent cooling mode starts as soon as the room temperature is above the set room temperature **"Room temperature"**, 7102) by **"Room t hyster.cool"** (7107). If the room temperature has fallen below the set room temperature by the same value, cooling mode ends.

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Swimming pool

The control unit backs up separate swimming pool heating (**"Swimming pool"**, 7008).

If the value of parameter **"Priority ext. demand"** (7019) is **"No"**, the swimming pool has the lowest priority compared to all other consumers. If this parameter is set to **"Yes"**, the swimming pool has priority over the heating circuits. Priority over DHW heating is only enabled if in addition, parameter **"DHW priority"** (6010) is set to **"No"**. It is therefore also possible, for example, to operate a DHW cylinder instead of a swimming pool at this connection. In contrast to "standard" DHW heating, neither switching times nor a maximum runtime for heating can be programmed for this connection. Under certain framework conditions, it is therefore possible that other system components will not be supplied for a prolonged period.
The heat demand is issued via a thermostat, which is connected to the control unit via external extension H1 (digital input 230 V~).


Installation/service instructions

The control unit starts swimming pool heating via the three-way diverter valve. The set flow temperature is specified by **"Set flow ex. demand"** (730C). Heating is carried out until the demand signal from the swimming pool thermostat is cleared. Renewed heating is only possible after a pause of at least 20 min.
If parameter **"Priority ext. demand"** (7019) is set to **"Yes"**, heating is carried out with all available heat sources. On **"No"**, only the heat pump (s) is used.

Note
The swimming pool is not heated in "Standby" operating mode.

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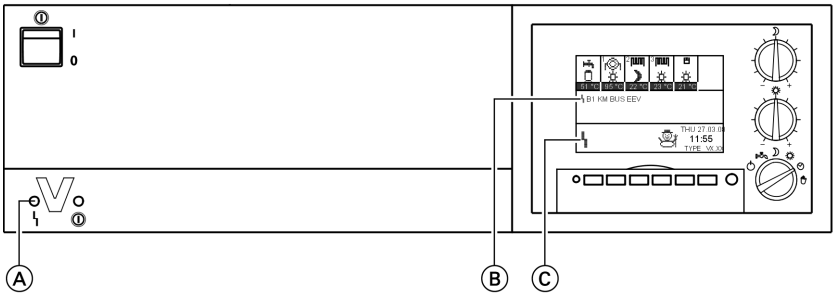
Control unit diagnostics

Scanning messages



Ⓐ Fault display

Ⓑ Message
Ⓒ Message symbol

Messages are displayed by the message symbols (ϟ, ¡, !) flashing. For faults (ϟ), the fault indicator also flashes.

Note
In this view, the setting level "Customer" is always enabled. To display all messages, enable the setting level "Contractor" or "Expert" (see page 10).

Type of message

Fault ϟ
- Message on the display, e.g. **"ϟB1 KM BUS EEV"**.
  Message symbol "ϟ" flashes.
  Fault indicator flashes.
- The central fault message terminal (2X7.12 / 2X7.13) is activated.

Installation/service instructions

- Message via communication facility (e.g. Vitodata, Vitocom) possible.
- The machine is no longer in standard mode; the fault must be removed **as quickly as possible**.

Warning !
- Message on the display, e.g. **"!03 Configuration fault"**.
  Message symbol **"!"** flashes.
- The appliance continues to operate without limitation, however the cause for the warning must be removed.

Note ¡
- Message on the display, e.g. **"¡C5 power-OFF"**.
  Message symbol "¡" flashes.
- The appliance retains its functionality, however the information needs to be noted.

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Control unit diagnostics (cont.)

Displaying and acknowledging messages

- Acknowledged messages are marked with ✓. The message and message symbol on the standard display are cleared. In case of faults, the fault indicator and central fault message connection are additionally deactivated.
- If an acknowledged message is not removed, this message is re-displayed the following day at 07:00 h.
- If the message **"A9: Heat pump"** is acknowledged, the system is heated in accordance with the selected operating mode (e.g. "Standard" operating mode) by the electric heater (if installed) with a correspondingly **high power consumption**. We therefore recommend **only** using this function to bridge a short period.

Press the following keys:

1. To log on as **"Contractor"** or **"Expert"**, see page 10.
2. **"Information"**.
3. **"Fault messages"**.
4. **"TIME"** for the times at which the messages occurred.
5. **"MESSAG"** to return to the message display.
6. **"ALL"** to acknowledge all messages.

Calling up message history

- The messages are listed in order of occurrence with the most recent first.
- Up to 30 entries are stored.
- The messages cannot be acknowledged in the message history.

Press the following keys:

1. To log on as **"Contractor"** or **"Expert"**, see page 10.
2. **"Information"**.
3. **"Statistics"**.
4. **"Message history"**.
5. **"TIME"** for time information associated with the message, where the preceding symbols have the following description.
   - → Time information relates to the time at which the message occurred.
   - ← Time information relates to the time at which the message was deleted or the fault was remedied.

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Control unit diagnostics (cont.)

6. "MESSAG" to return to the message display.

Deleting message history
*Press **"Reset"**.*

Message overview

All messages that occur for all heat pump types are listed below. Not every message can occur for all types. The messages are identified by a two-digit code.

Description of suitable measures
Installation/service instructions

Note
For some faults, the control unit automatically selects certain system characteristics (see separate table on page 58).

Message		Cause	Measures
!01	System fault	Control unit processor faulty (🔒)	Replace programming unit.
!02	Std after data err	Delivered condition set after recognition of data fault	Reconfigure system.

▶▶

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Control unit diagnostics (cont.)

Message		Cause	Measures
!03	Configuration fault	Incorrect configuration of system components; possible causes: ■ External heat source enabled and NC-Box mixer controlled directly via heat pump control unit (**"Type NC mixer"**, 7115 set to **"1"**). ■ Room temperature sensor for heating circuit switched to cooling mode (**"Ranking RTS"**, 7106) without remote control (**"Remote control"**, 2003) being enabled. ■ Cooling on heating circuit: Max. set flow temperature for heating circuit (**"Max. flow temp"**, 200E) lower than min. set flow temperature for cooling mode (**"Min flow temp."**, 7103). ■ Cooling mode enabled for unavailable heating circuit (**"Cooling circuit"**, 7101). ■ Heat pump cascades enabled via external extension H1 or LON without components being installed.	Check and match associated parameters, reset to delivered condition if required (**"Reset"**, see operating instructions), and reconfigure system.
┦05	Fault EEV	Fault message from EEV controller, compressor stage 1	Observe messages in heat pump module diagnosis (see page 59).
┦06	Fault EEV 2	Fault message from EEV controller, compressor stage 2	Observe messages in heat pump module diagnosis (see page 59).

Control unit diagnostics (cont.)

Message		Cause	Measures
i07	Message EEV	Message from EEV controller, compressor stage 1 (◔)	Observe messages in heat pump module diagnosis (see page 59).
i08	Message EEV 2	Message from EEV controller, compressor stage 2 (◔)	Observe messages in heat pump module diagnosis (see page 59).
┦10	Outside sensor	Short circuit, outside temperature sensor (see table below A)	Check pressure drop value (Ni 500) at connections 3X1.16 and 3X2.16; replace sensor if required.
┦18	Outside sensor	Break, outside temperature sensor (see table below A)	Check pressure drop value (Ni 500) at connections 3X1.16 and 3X2.16; replace sensor if required.
┦20	Flow sens. secondary	Short circuit - secondary circuit flow temperature sensor (see table below B)	Check pressure drop value (Pt 500) at connections 3X1.20 and 3X2.20; replace sensor if required.
┦21	Sec. return sensor	Short circuit - secondary circuit return temperature sensor (see table below C)	Check pressure drop value (Pt 500) at connections 3X1.19 and 3X2.19; replace sensor if required.
┦22	Sec. return sensor	Short circuit - secondary circuit return temperature sensor, compressor stage 2	Check pressure drop value (Pt 500) at connections 3X1.18 and 3X2.18; replace sensor if required.
┦28	Flow sens. secondary	Break - secondary circuit flow temperature sensor (see table below B)	Check pressure drop value (Pt 500) at connections 3X1.20 and 3X2.20; replace sensor if required.
┦29	Sec. return sensor	Break - secondary circuit return temperature sensor (see table below C)	Check pressure drop value (Pt 500) at connections 3X1.19 and 3X2.19; replace sensor if required.
┦2A	Sec. return sensor	Break - secondary circuit return temperature sensor, compressor stage 2	Check pressure drop value (Pt 500) at connections 3X1.18 and 3X2.18; replace sensor if required.

▶▶

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Control unit diagnostics (cont.)

Message		Cause	Measures
┦30	Flow sensor primary	Type BW/WW ■ Short circuit - primary circuit flow temperature sensor (heat pump inlet) Type AW ■ Short circuit, air inlet temperature sensor (see table below D)	Check pressure drop value (Pt 500) at connections 3X1.24 and 3X2.24; replace sensor if required. .
┦31	Primary return sens.	Type BW/WW ■ Short circuit - primary circuit return temperature sensor (heat pump outlet) Type AW ■ Short circuit - air outlet temperature sensor (see table below D)	Check pressure drop value (Pt 500) at connections 3X1.23 and 3X2.23; replace sensor if required.
┦32	Evaporator sens.	Short circuit - evaporator temperature sensor	Check pressure drop value (type Pt 500) at connections 3X1.5 and 3X2.5; replace sensor if required.
┦33	Hot gas	Short circuit - hot gas temperature sensor	Check pressure drop value (type Pt 500) at connections 3X1.1 and 3X2.1; replace sensor if required.
┦34	Hot gas 2	Short circuit - hot gas temperature sensor, compressor stage 2	Check pressure drop value (type Pt 500) at connections 3X1.3 and 3X2.3; replace sensor if required.
┦38	Flow sensor primary	Type BW/WW ■ Break - primary circuit flow temperature sensor (heat pump inlet) Type AW ■ Break - air inlet temperature sensor (see table below D)	Check pressure drop value (Pt 500) at connections 3X1.24 and 3X2.24; replace sensor if required. .

Control unit diagnostics (cont.)

Message		Cause	Measures
┤39	Primary return sens.	Type BW/WW ■ Break - primary circuit return temperature sensor (heat pump outlet) Type AW ■ Break - air outlet temperature sensor (see table below D)	Check pressure drop value (Pt 500) at connections 3X1.24 and 3X2.24; replace sensor if required.
┤3A	Evaporator sens.	Break - evaporator temperature sensor	Check pressure drop value (type Pt 500) at connections 3X1.5 and 3X2.5; replace sensor if required.
┤3B	Hot gas	Break - hot gas temperature sensor	Check pressure drop value (type Pt 500) at connections 3X1.1 and 3X2.1; replace sensor if required.
┤3C	Hot gas 2	Break - hot gas temperature sensor, compressor stage 2	Check pressure drop value (type Pt 500) at connections 3X1.3 and 3X2.3; replace sensor if required.
┤40	Flow sensor HC2	Short circuit, flow temperature sensor heating circuit M2 (mixer circuit) (see table below E)	Check pressure drop value (Ni 500) at connections 3X1.10 and 3X2.10; replace sensor if required.
┤41	Flow sensor HC3	Short circuit, flow temperature sensor heating circuit M3 (mixer circuit) (see table below F)	Check pressure drop value (Ni 500) at extension kit connections for heating circuit with mixer; replace sensor if required.
┤43	Flow sensor system	Short circuit - system flow temperature sensor	Check pressure drop value (Pt 500) at connections 3X1.9 and 3X2.9; replace sensor if required.
┤44	Flow sensor NC	Short circuit - flow temperature sensor of natural cooling function unit	Check pressure drop value (Ni 500) at connections 3X1.8 and 3X2.8; replace sensor if required.
┤48	Flow sensor HC2	Break, heating circuit M2 flow temperature sensor (see table below E)	Check pressure drop value (Ni 500) at connections 3X1.10 and 3X2.10; replace sensor if required.

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Control unit diagnostics (cont.)

Message		Cause	Measures
┦49	Flow sensor HC3	Break, flow temperature sensor heating circuit M3 (see table below F)	Check pressure drop value (Ni 500) at extension kit connections for heating circuit with mixer; replace sensor if required.
┦4B	Flow sensor system	Break, system flow temperature sensor	Check pressure drop value (Pt 500) at connections 3X1.9 and 3X2.9; replace sensor if required.
┦4C	Flow sensor NC	Break - flow temperature sensor of natural cooling function unit	Check pressure drop value (Ni 500) at connections 3X1.8 and 3X2.8; replace sensor if required.
┦50	DHW sensor Top	Short circuit, top cylinder temperature sensor (see table below G)	Check pressure drop value (Pt 500) at connections 3X1.14 and 3X2.14; replace sensor if required.
┦52	DHW sensor Bottom	Short circuit, bottom cylinder temperature sensor (see table below H)	Check pressure drop value (Pt 500) at connections 3X1.13 and 3X2.13; replace sensor if required.
┦54	DHW solar	Short circuit - Vitosolic cylinder temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
┦58	DHW sensor Top	Break, top cylinder temperature sensor (see table below G)	Check pressure drop value (Pt 500) at connections 3X1.14 and 3X2.14; replace sensor if required.
┦5A	DHW sensor Bottom	Break, bottom cylinder temperature sensor (see table below H)	Check pressure drop value (Pt 500) at connections 3X1.13 and 3X2.13; replace sensor if required.
┦5C	DHW solar	Break, Vitosolic cylinder temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
┦60	Buffer cylinder sensor	Short circuit, buffer cylinder temperature sensor (see table below K)	Check pressure drop value (Pt 500) at connections 3X1.22 and 3X2.22; replace sensor if required.

Control unit diagnostics (cont.)

Message		Cause	Measures
┤63	Ext. heat source	Short circuit, external heat source temperature sensor (see table below L)	Check pressure drop value (Pt 500) at connections 3X1.4 and 3X2.4; replace sensor if required.
┤68	Buffer cylinder sensor	Break, buffer cylinder temperature sensor (see table below K)	Check pressure drop value (Pt 500) at connections 3X1.22 and 3X2.22; replace sensor if required.
┤6B	Ext. heat source	Break, external heat source temperature sensor (see table below L)	Check pressure drop value (Pt 500) at connections 3X1.4 and 3X2.4; replace sensor if required.
┤70	Room sensor HC1	Short circuit, room temperature sensor heating circuit A1 (see table below M)	Check remote control sensor and replace if required (see Vitotrol service instructions).
┤71	Room sensor HC2	Short circuit, room temperature sensor heating circuit M2 (see table below M)	Check remote control sensor and replace if required (see Vitotrol service instructions).
┤72	Room sensor HC3	Short circuit, room temperature sensor heating circuit M3 (see table below M)	Check remote control sensor and replace if required (see Vitotrol service instructions).
┤73	Room sensor NC	Short circuit - natural cooling room temperature sensor	Check pressure drop value (type Ni 500) at connections 3X1.6 and 3X2.6; replace sensor if required.
┤78	Room sensor HC1	Break, room temperature sensor heating circuit A1 (see table below M)	Check remote control sensor and replace if required (see Vitotrol service instructions).
┤79	Room sensor HC2	Break, room temperature sensor heating circuit M2 (see table below M)	Check remote control sensor and replace if required (see Vitotrol service instructions).
┤7A	Room sensor HC3	Break, room temperature sensor heating circuit M3 (see table below M)	Check remote control sensor and replace if required (see Vitotrol service instructions).

Control unit diagnostics (cont.)

Message		Cause	Measures
┤7B	Room sensor NC	Break - natural cooling room temperature sensor	Check pressure drop value (type Ni 500) at connections 3X1.6 and 3X2.6; replace sensor if required.
┤92	Collector sensor	Short circuit, Vitosolic collector temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
┤93	Solar return sensor	Short circuit - Vitosolic return temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
┤9A	Collector sensor	Break, Vitosolic collector temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
┤9B	Solar return sensor	Break - Vitosolic return temperature sensor	Check sensor and replace if required (see Vitosolic installation and service instructions).
!A4	Check valve	Solar check valve stuck or faulty	Inspect check valve and replace if required (see Vitosolic installation and service instructions).
┤A6	Secondary pump	No volume flow in secondary circuit (secondary circuit pump stopped)	Test voltage at connection 2X8.7 and check secondary pump mechanically; replace if required.
┤A7	Solar circuit	No volume flow in solar circuit (solar circuit pump stopped)	Check solar circuit pump and replace if required (see Vitosolic installation and service instructions).
┤A8	Pump heat. circuit 1	No volume flow in heating circuit A1 (circulation pump stopped)	Test voltage at connection 2X7.9 and check pump mechanically; replace if required.

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Control unit diagnostics (cont.)

Message	Cause	Measures
ϟA9 Heat pump	Heat pump fault ■ Heat pump faulty ■ Safety high pressure switch has activated ■ Control high pressure or low pressure switch has responded 8 times within 24 h. ■ Fault EEV controller ■ Temperature sensors in primary/secondary circuit faulty ■ Type AW protective motor switch in fan has responded.	Scan further messages ("Message history" see page 41); check volume flow rates, motor currents/ motor protection, and safety high pressure switch. ***Note*** *After removing fault, switch appliance OFF and ON again once.*
ϟAB Electric heating	Electric heater fault; instantaneous heating water heater faulty or high limit safety cut-out has responded.	⚠ **Danger** Contact with 'live' components can lead to severe injury from electric current. Isolate the power supply prior to starting work on the appliance. ■ Test electric heater control signal at connections 2X7.5 (stage 2) and 2X8.8 (stage 1); check instantaneous heating water heater and high limit safety cut-out (STB) and reset if required (see also installation instructions - instantaneous heating water heater). ■ Test immersion heater control signal at connection 2X8.13; check immersion heater.

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Control unit diagnostics (cont.)

Message		Cause	Measures
↿AD	Mixer heat./ DHW	Three-way diverter valve "central/DHW heating" faulty	Check three-way diverter valve and replace if required.
¡AE	DHW sensors swapped	Cylinder temperature sensors top/bottom interchanged (🚿)	No measures required. The control unit interchanges the sensors internally.
↿AF	Cylinder primary pump	■ Circulation pump for cylinder heating faulty ■ Circulation volume in cylinder primary system too low; cylinder primary pump or two-way valve on cylinder primary system faulty.	■ Circulation pump for cylinder heating: Test voltage at connection 2X7.10 and check pump mechanically; replace if required. ■ Cylinder primary pump/ two-way valve: Test voltage at connection 2X8.12 and check pump/valve mechanically; replace if required.
↿B0	Equipment recognition	Error in recognising appliance version, incorrect coding card or PCBs faulty.	■ Check sensor input F11 on PCB 3. Never connect any external components. ■ Check coding card and replace if required. ■ Check PCBs and replace if required.
↿B1	KM BUS EEV	Communication error with EEV controller, compressor stage 1	Test EEV controller voltage at connection 2X8.2; check KM BUS connection and leads/cables; replace PCB if required.
↿B2	KM BUS EEV	Communication error with EEV controller, compressor stage 2	Check leads/cables; EEV controller PCB: Check power supply and replace PCB if required.
↿B4	A-D converter	Internal fault ADC (analog digital converter, reference), ribbon cable between sensor PCB and main PCB faulty, or PCBs faulty	Check sensor connections F1, F5, F10, F15, F19 and F22 on PCB 3. Never connect any external components. Check PCB and replace if required.
↿B5	EEPROM	Internal error EEPROM	Replace coding card.

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Control unit diagnostics (cont.)

Message		Cause	Measures
↿B9	KM BUS Solar	Communication error - KM BUS solar control unit, or sensor S3 of Vitosolic faulty	■ Check parameter **"Vitosolic type"** (7016). ■ Check connection to Vitosolic. ■ Check sensor S3 and replace if required. (see Vitosolic installation and service instructions)
↿BA	KM BUS Mi/ HC	KM BUS communication error or internal fault in extension kit for one heating circuit with mixer M3	Check extension kit connections and code.
↿BB	KM BUS NC mixer	KM BUS communication error or internal fault in natural cooling extension kit	Check extension kit connections and code.
↿BC	HC1 R/C KM BUS	Communication error - KM BUS remote control; heating circuit without mixer A1	Check remote control connections and code; switch ON remote control.
↿BD	HC2 R/C KM BUS	Communication error - KM BUS remote control; heating circuit with mixer M2	Check remote control connections and code; switch ON remote control.
↿BE	HC3 R/C KM BUS	Communication error - KM BUS remote control; heating circuit with mixer M3	Check remote control connections and code; switch ON remote control.
↿BF	Communication module	LON communication error; incorrect LON communication module	Check connections and type of LON communication module.
↿C2	Power supply monitor	Compressor power supply fault or phase monitor faulty	Check phase connection and power supply; check phase monitor.
¡C5	Power OFF	Power-OFF enabled (triggered by power supply utility)	No measures required.

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Control unit diagnostics (cont.)

Message		Cause	Measures
↿C9	Refrigerant circuit	Fault - refrigerant circuit, compressor stage 1; high limit safety cut-out has responded	■ Check flow and return temperature sensors in primary and secondary circuits. ■ Check primary and secondary circuits for pressure and throughput (see also fault ↿A9). ■ Have heat pump tested by a refrigeration engineer.
↿CA	Primary source	Fault - primary circuit, compressor stage 1 Type BW ■ Flow rate in primary circuit too low ■ Primary pump thermal relay has responded. Type AW ■ Faulty power supply to fan or fan faulty/blocked	Type BW ■ Reset thermal relay, check primary pump and replace if required. ■ Check safety equipment (frost protection brine pressure, frost protection AC-Box) on terminals 3X3.9 and 3X3.8; in systems without safety equipment, check jumpers 3X3.9 to 3X3.8. Type AW ■ Fan troubleshooting (see service instructions)
¡CB	Primary temperature	Min. primary inlet temperature not achieved.	Type BW ■ Check brine circuit for flow rate. Type AW ■ No measures required since outside temperature too low.

Control unit diagnostics (cont.)

Message		Cause	Measures
┦CC	Coding card	Coding card cannot be read.	■ Check coding card and replace if required. ■ Check PCB 2 (main PCB) and replace if required. ■ Check programming unit of heat pump control unit and connecting cable; replace if required.
┦CD	KM BUS Vitocom	Communication error KM BUS Vitocom 100	Check Vitocom 100 connections and connecting cables.
┦CE	KM BUS ext. CE	Communication error KM BUS external extension H1	Check external extension H1 connections and connecting cables.
┦CF	Communication module	Communication error - LON module in control unit	Check LON communication module and replace if required.
┦D1	Compressor	Compressor fault - compressor stage 1, thermal compressor relay or safety element of full wave soft starter (if installed) has responded.	■ Reset thermal relay at compressor, check the setting, reset to delivered condition (**"Reset"**, see operating instructions), check compressor electrical connections, and test coil resistance of compressor motor. ***Note*** *If overheating occurs, internal motor protection does not re-enable compressor for 1-3 hours.* ■ If required, replace full wave soft starter (if installed) or compressor.

Control unit diagnostics (cont.)

Message	Cause	Measures
!D3 Low pressure	Low pressure fault - compressor stage 1 Type BW/WW ■ Primary circuit leaks or primary pump faulty ■ Intermediate circuit leaks or intermediate circuit pump faulty Type AW ■ Fan faulty or air ducts blocked All types ■ Heat pump faulty	Type BW/WW ■ Reset pressure switch; check pressure gauge, primary pump and shut-off facilities. ■ Check pressure gauge and intermediate circulation pump. ***Note*** *Pressure switch resets itself automatically.* Type AW ■ Check fan and shut-off facilities; clean air ducts if required. All types ■ Have heat pump tested by a refrigeration engineer.
iD4 Control high pressure	High pressure fault - compressor stage 1 ■ Air in heating circuit ■ Secondary pump or heating circuit pump stalled ■ Condenser contaminated ■ Pressure sensor faulty	■ Vent heating circuit. ■ Check system pressure. ■ Check secondary pump and heating circuit pumps. ■ Flush heating circuits. ***Note*** *In rare cases, e.g. during DHW heating, a control high pressure shutdown can occur.* *If this occurs several times in succession, check heat pump and configuration of refrigerant circuit.*

Control unit diagnostics (cont.)

Message	Cause	Measures
↯D6 Flow switch	Primary circuit flow switch has responded.	Type BW ■ Check primary pump. Type WW ■ Check immersion pump. ■ Check frost protection switch and heat exchanger in intermediate circuit.
↯DA Compressor 2	Compressor fault - compressor stage 2, thermal compressor relay or safety element of full wave soft starter (if installed) has responded.	■ Reset thermal relay at compressor, check the setting, reset to delivered condition (**"Reset"**, see operating instructions), check compressor electrical connections, and test coil resistance of compressor motor. ■ If required, replace full wave soft starter (if installed) or compressor.
↯DB Refrigerant circ.2	Fault - refrigerant circuit, compressor stage 2; high limit safety cut-out has responded.	■ Check flow and return temperature sensors. ■ Check primary and secondary circuits for pressure and throughput (see also fault ↯A9). ■ Have heat pump tested by a refrigeration engineer.

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Control unit diagnostics (cont.)

Message		Cause	Measures
!DC	Low pressure 2	Low pressure fault - compressor stage 2 Type BW/WW ■ Primary circuit leaks or primary pump faulty ■ Intermediate circuit leaks or intermediate circuit pump faulty Type AW ■ Fan faulty or air ducts blocked All types ■ Heat pump faulty	Type BW/WW ■ Reset pressure switch; check pressure gauge, primary pump and shut-off facilities. ■ Check pressure gauge and intermediate circulation pump. ***Note*** *Pressure switch resets itself automatically.* Type AW ■ Check fan and shut-off facilities; clean air ducts if required. All types ■ Have heat pump tested by a refrigeration engineer.
iDD	Ctrl. high press. 2	Control high pressure - compressor stage 2 (🔒) ■ Air in heating circuit ■ Secondary pump or heating circuit pump stalled ■ Condenser contaminated ■ Pressure sensor faulty	■ Vent heating circuit. ■ Check system pressure. ■ Check secondary pump and heating circuit pumps. ■ Flush heating circuits. ***Note*** *In rare cases, e.g. during DHW heating, a control high pressure shutdown can occur.* *If this occurs several times in succession, check heat pump and configuration of refrigerant circuit.*

Control unit diagnostics (cont.)

Message		Cause	Measures
↯DE	Primary source 2	Fault - primary circuit, compressor stage 2 Type BW ■ Flow rate in primary circuit too low ■ Primary pump thermal relay has responded. Type AW ■ Faulty power supply to fan or fan faulty/blocked	Type BW ■ Reset thermal relay, check primary pump and replace if required. ■ Check safety equipment (frost protection brine pressure, frost protection AC-Box) on terminals 3X3.9 and 3X3.8; in systems without safety equipment, check jumpers 3X3.9 to 3X3.8. Type AW ■ Fan troubleshooting (see service instructions)
↯E0	LON subscriber	LON subscriber has failed or connection faulty.	■ Call up fault memory at faulty subscriber. ■ Check address (system and subscriber numbers); check connections and LON connecting cables.
↯E1	Ext. heat generation	Fault - external heat source	Check external heat source.
↯E2	Fault lag heat p	Fault at a lag heat pump in the cascade.	Check heat pump control unit display at lag heat pump.
iFF	New start	Control unit restart	No measures required.

Further information regarding messages (system characteristics)

Message		System characteristics
A	↯10 ... ↯18 ...	Operation with outside temperature -40 °C.
B	↯20 ... ↯28 ...	Operation with temperature value of return temperature sensor in secondary circuit, minus 5 K. If both temperature sensors (secondary flow and return) are faulty, the heat pump is stopped (message ↯A9).

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Control unit diagnostics (cont.)

Message		System characteristics
C	↳21 ... ↳29 ...	Operation with temperature value of flow temperature sensor in secondary circuit, minus 5 K. If both temperature sensors (secondary flow and return) are faulty, the heat pump is stopped (message ↳A9).
D	↳30 ... ↳31 ... ↳38 ... ↳39 ...	Heat pump does not start.
E	↳40 ... ↳48 ...	Mixer heating circuit M2 is closed.
F	↳41 ... ↳49 ...	Mixer heating circuit M3 is closed.
G	↳50 ... ↳58 ...	Operation with temperature value of the **lower** cylinder temperature sensor. DHW heating is blocked if only one sensor is available or both sensors are faulty.
H	↳52 ... ↳5A ...	Operation with temperature value of the **upper** cylinder temperature sensor. If both sensors are faulty, DHW heating is blocked.
K	↳60 ... ↳68 ...	Buffer cylinder is heated once every hour. Heating stops according to set value of the return temperature sensor.
L	↳63 ... ↳6B ...	External heat source is blocked. Instantaneous heating water heater (if installed) is enabled.
M	↳70 ... ↳71 ... ↳72 ... ↳78 ... ↳79 ... ↳7A ...	■ No frost protection mode via room temperature sensor ■ No room temperature hook-up ■ No room temperature control

Heat pump module diagnosis

The refrigerant circuit of heat pumps with an electronic expansion valve are controlled by the EEV controller, which communicates permanently with the heat pump control unit via KM BUS. If the refrigerant circuit has a vapour injection (Enhanced Vapour Injection, EVI), this is also controlled via the EEV controller (see page 13).

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Control unit diagnostics (cont.)

The diagnosis function of the heat pump control unit displays important features of the EEV controller. Along with status and fault information, these also include the last temperature and pressure values directly before the compressor shut-down. In addition, the compressor hours run are displayed for different load classes. A load class specifies the compressor operation at a certain differential of evaporation and condensation temperature $\Delta T_{V/K}$.

Note
The diagnostic information displayed here is independent of the fault codes in the heat pump control unit.

Menu
- **"Device settings"**
- **"Contractor level"**
- **"Further menu items"**
- **"Diag. HP module"**

- **"1"** for diagnosis overview - compressor stage 1
- **"2"** for diagnosis overview - compressor stage 2
- **"T/P"** for temperature and pressure values
- **"H"** hours run for the various load classes

Diagnosis overview - compressor stage 1 or 2

Displays

Display	Description
I [–]	Information code (commands, status, versions)
Tsh, Tc [°C]	Tsh: Set superheating temperature (**"Superheating"**, 5019) Tc: Set hot gas temperature for start of the vapour injection (EVI)
Pmop [bara]	Max. suction gas pressure ("maximum operating pressure")
Ts, Tc [°C]	Ts: Actual suction gas temperature Tc: Actual condensation temperature
Ps [bara]	Actual suction gas pressure
Pc [bara]	Actual condensation pressure
TI [°C]	Actual LPG temperature
x, P [%]	x: EEV position P: Set compressor output
Err [–]	Fault information code (fault 1, fault 2, fault messages)

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Control unit diagnostics (cont.)

Information code part 1 (commands)

Commands		Status		Versions	
1	**2**	3	4	5	6
00	**00**	00	00	00	00

Part 1 of the information code shows the most recent commands that the heat pump control unit transferred to the EEV controller. This four-digit code is subdivided into two groups. Every group provides information in hexadecimal notation. This notation has the advantage of being able to display extensive amounts of information with only a few digits.
The possible hexadecimal codes have the following descriptions:

Group 1 (1st and 2nd digits from the left)
01 Enable EEV controller
02 Enable EVI control circuit
04 Cooling mode enabled
40 Refrigerant circuit parameters reset by EEV controller

Note
If several pieces of information for one unit have to be displayed simultaneously, the information codes are added together. The numbers are added hexadecimally, so that e.g. the sum of 04 and 08 is not 12, but rather 0C. The totals are unique, i.e. there is only one possible set of summands for one total displayed.

Group 2 (3rd and 4th digits from the left)
No function.

Information code part 2 (status)

Commands		**Status**		Versions	
1	2	**3**	**4**	5	6
00	00	**00**	**00**	00	00

The second part of the information code contains the current status information for the EEV controller; as per part 1 in two groups and hexadecimal notation.

The heat pump control unit can record some status information both via the KM BUS to the EEV controller, and directly via the digital inputs. For this reason, some status listings are duplicate.

Group 3 (5th and 6th digits from the left)
01 Enable EEV controller via KM BUS
02 Enable EVI control circuit
04 Cooling mode enabled via KM BUS
08 Compressor on
10 Digital scroll relay enabled
20 EVI valve enabled

Control unit diagnostics (cont.)

40 Enable EEV controller via digital input
80 Cooling mode enabled via digital input

Information code part 3 (versions)

Commands		Status		**Versions**	
1	2	3	4	**5**	**6**
00	00	00	00	**00**	**00**

Group 5 contains the hardware version of the EEV controller, and group 6 the software version.

Note
The hardware and software versions are important information for fault analysis in the refrigerant circuit. Always specify these in case of questions regarding the refrigerant circuit.

Fault information code, part 1 (fault location)

Fault location				Messages	
1		2	3	4	5
00	:	00	00	00	00

Part 1 of the fault information code contains the location of a fault in the refrigerant circuit, e.g. hot gas temperature sensor. The first two digits of the code are identical to part 2 (status), however this information is processed taking the influence of other factors into account. This information is therefore not always available at the same time as part 2.

Group 1 (1st and 2nd digits, left of the colon)
01 Suction gas pressure sensor faulty
02 Suction gas temperature sensor faulty
04 Condensation pressure sensor faulty
08 Condensation temperature sensor faulty
10 LPG temperature sensor faulty
20 EEV stepper motor faulty

Fault information code, part 2 (fault location)

Fault location				Messages	
1		**2**	**3**	4	5
00	:	**00**	**00**	00	00

Group 4 (7th and 8th digits)
01 Compressor shutdown due to fault

Control unit diagnostics (cont.)

Part 2 of the fault information code contains two groups which display the fault location in the refrigerant circuit. The first two digits of the code are identical to part 1, but are accepted directly from the EEV controller and displayed.

Group 2 (3rd and 4th digits)
As per fault information code part 1

Group 3 (5th and 6th digits)
No function.

Fault information code, part 3 (fault messages)

Fault location				Messages	
1		2	3	**4**	**5**
00	:	00	00	**00**	**00**

Part 3 of the fault information code specifies the cause of the fault that has occurred.

Group 4 (7th and 8th digits)

01 Pressure gas temperature Tc too high
02 Condensation pressure too high (control high pressure shutdown)
04 Superheating temperature too low
08 Superheating temperature too high
10 Inadequate suction pressure (low pressure shutdown)

Group 5 (9th and 10th digits)

01 Maximum operating pressure, MOP (**"MOP limit"**, 501A), was reached; control type (superheating/suction pressure control) in refrigerant circuit was briefly matched.
02 Fault due to impermissible combination of refrigerant circuit conditions. A serious EEV controller fault has occurred, as the heat pump control unit only transfers permissible parameter combinations to the EEV controller.

Temperature and pressure values

The temperature and pressure values displayed have the following descriptions:

tpe °C Primary circuit inlet temperature
tpa °C Primary circuit outlet temperature
tse °C Secondary circuit return temperature
tsa °C Secondary circuit flow temperature
p0 bara Evaporation pressure
pc bara Condensation pressure
Err/Msg Last fault information code before a compressor shutdown, parts 2 and 3 for compressor stages 1 and 2, see page 62

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Control unit diagnostics (cont.)

Note
While the compressor is running, the control unit in this overview continuously displays the current test values. After the compressor has shut down, the last values measured during operation can be called up.

Hours run

The compressor hours run given in the individual lines belong to the following load classes:

Line	Hours run at
1	$\Delta T_{V/K}$ < 25 K
2	25 K < $\Delta T_{V/K}$ < 32 K
3	32 K < $\Delta T_{V/K}$ < 41 K
4	41 K < $\Delta T_{V/K}$ < 50 K
5	$\Delta T_{V/K}$ > 50 K

$\Delta T_{V/K}$ Differential - evaporation and condensation temperature

Access protocol

The access protocol shows the change history for the control unit parameters in tabular form.

Note
The control unit records the last 30 changes each. Older entries are automatically deleted.

Menu
- **"Device settings"**
- **"Contractor level"**
- **"Further menu items"**
- **"Access protocol"**

The access protocol columns contain the following information (from left to right):

Column	Description
1	Date
2	Number of parameter changed
3	Last value selected
4	Setting level or type of access enabled at time of change

The setting levels or type of access in the 4th column of the access protocol are given as figures. These have the following descriptions:

Number	Description
0	"Customer" setting level
1	"Contractor" setting level
2	"Expert" setting level

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Control unit diagnostics (cont.)

Number	Description
3	"Manufacturer/development" setting level
4	External access, e.g. via the Vitocom 100 remote monitoring module
5	Internal access, automatic matching of certain parameters, e.g. when selecting a different system diagram

LON communication module diagnosis

If the heat pump control unit has a LON communication module installed, and this is enabled via parameter **"LON module installed"** (7710), important diagnostic information can be displayed on the heat pump control unit. This can be useful during commissioning and during troubleshooting the LON.

The individual pieces of information are grouped thematically on different display screens, which you can scroll through. The first screen has the description **"BUS settings"**; all following screens have the title **"LON diagnosis"**.

Note
This section is intended for experts who are familiar with LON configuration, commissioning and fault analysis. All terms in LON technology are explained in detail in the Viessmann LON manual.

Menu
- **"Device settings"**
- **"Contractor level"**
- **"Further menu items"**
- **"BUS settings"**

BUS settings

The **"BUS settings"** page shows the address of the LON subscriber. This comes either via the physical network address of the neuron chip, or via the logical network address, comprising domains, and system and subscriber number.

Control unit diagnostics (cont.)

Information displayed

Display	Description	
	for "Tool binding" (see page 67)	**for "Self binding" (see page 67)**
Neuron ID	Physical address of the neuron chip integrated in the LON communication module.	
Domain	Network domains, data is hexadecimal, last digit specifies length of the domain designation used.	
	Allocated via "Binding tool".	Preset in Viessmann control units to the value 07 and length 1.
Subnet	Subnet address	
	Allocated via "Binding tool".	Corresponds to the system number, parameter **"System number"** (7798).
Node	Address of network node	
	Allocated via "Binding tool".	Corresponds to the subscriber number, parameter **"Subscriber number"** (7777).

Along with information display, different functions can be implemented on this page by pressing the selection keys.

Functions

Function	Description
DIAG.	Continue to the LON diagnosis pages
RES1	"Reset": Reset the LON module without carrying out binding (logically linking the LON subscribers) again.
RES2	"Master reset": Reset the LON module and automatically carry out binding via an integral installation program ("Self binding").
SP	"Service pin message": Send a standardised identifying message within the LON, which can be received via suitable diagnosis programs.
BACK	Leave a page

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Control unit diagnostics (cont.)

LON diagnosis

The diagnostic information are available on several pages; scroll through them by pressing **">>"**.

Information overview - LON diagnostic pages

Page	Information
1	Standard information - LON subscriber
2	Further information - LON subscriber
3	Values of the function objects ■ HKFDM - external heating circuit control units (contained on LON side in CFDM object) ■ CFDM - System or external control ■ DHWC - DHW heating
4	Values of the function objects ■ HCC1 - heating circuit A1 ■ HCC2 - heating circuit M2 ■ HCC3 - heating circuit M3
5	Values of the function objects ■ PM1 - lag heat pump 1 ■ PM2 - lag heat pump 1 ■ PM3 - lag heat pump 1 ■ PM4 - lag heat pump 1 ***Note*** *Page 5 is only visible if a heat pump cascade is installed via LON and configured.*

Page 1

Display	Description
SN neuron	Neuron chip - Viessmann part number
SN foreign	Communication coprocessor - Viessmann part number
Netconfig	Configuration status: 0 "Self binding": Logical linking during installation was carried out via integral installation program. 1 "Tool binding": Logical linking during installation was carried out via external installation program ("Binding tool"), e.g. on a laptop.

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Control unit diagnostics (cont.)

Display	Description
SndHrtBeat	"Send heartbeat": Currently used time interval in 100 ms to cyclically send network variables; matching is possible via a "Binding tool". ***Note*** *This time interval must be smaller than the receive interval set at all subscribers; parameter **"Receive heartbeat"** (779C).*
Obj. status	Object status: Value of network variable "nvoNodeStatus"; see Viessmann LON manual, in brackets: Internal software code without function.
SKO status	Software communication status: K LON communication module installed; parameter 7710 set to **"Yes"**. F LON communication module processing is enabled. N Network variable processing is enabled. A LON communication module recognised, communication enabled.

Page 2

Display	Description
LON1 / LON2 / foreign	LON module identification

Control unit diagnostics (cont.)

Display	Description
RTO	"Receive timeout": If one of the following network variables was not received in the receive interval (receive heartbeat), the symbol **"X"** appears at the corresponding point of the sequence displayed (1 or 2 lines, subject to configuration). 1 nviNodeAlarm 2 nviNodeOATemp 3 nviBocBoilerCmd 4 nviBocApplicMd 5 nviBocSetpoint 6 nviCfdmProdCmd 7 nviCfdmApplicMd 8 nviCfdmSetpoint 9 nviCfdmConsDmd 10 nviDhwcApplicMd 11 nviHcc1ApplicMd 12 nviHcc1SpaceSet 13 nviHcc1FlowTemp 14 nviHcc2ApplicMd 15 nviHcc2SpaceSet 16 nviHcc2FlowTemp 17 nviHcc3ApplicMd 18 nviHcc3SpaceSet 19 nviHcc3FlowTemp 20 nviPM1BlrState 21 nviPM1SupplyT 22 nviPM1BoCState 23 nviPM2BlrState 24 nviPM2SupplyT 25 nviPM2BoCState 26 nviPM3BlrState 27 nviPM3SupplyT 28 nviPM3BoCState 29 nviPM4BlrState 30 nviPM4SupplyT 31 nviPM4BoCState For a description of the network variables, see the Viessmann LON manual.

Control unit diagnostics (cont.)

Display	Description
Rel	Relay status: Value of network variable "nvoNodeRlyState", currently used time interval in "100 ms" to cyclically send network variables; matching is possible via a Binding tool. ***Note*** *This time interval must be significantly smaller than the receive interval set at all subscribers; parameter **"Receive heartbeat"** (779C).*
Obj. status	Object status: Value of network variable "nvoNodeStatus"; see Viessmann LON manual
> / <	Precedes sizes displayed: > Value was received. < Value was sent. Setting via parameters **"Outside temp"** (7797) and **"Time"** (77FF).
AT	Last transferable outside temperature value*[1]
[ ]	Possible status of outside temperature sensor: 0 OK 6 Not available: Sensor data not evaluated by the software, e.g. if system diagram 11 is selected. 8 Fault: Sensor does not show valid values due to short circuit or lead break.
Z	Last transferable time stamp (date, time)*[2]

Page 3

The LON function objects are interfaces to the individual control functions. On page 3 of the LON diagnosis, the heat pump control unit displays the specifications received or sent via LON for different function objects.

*[1] *Only displayed if transfer (send or receive) is enabled with parameter 7797.*

*[2] *Only displayed if transfer (send or receive) is enabled with parameter 77FF.*

Control unit diagnostics (cont.)

Function object HKFDM - external heating circuit control units

Display	Description
BA	**Operating mode:** 0 "Standby" 1 "Reduced" 2 "Standard" 3 "Fixed value" f "None"
BM	**Operating mode:** 0 "Off" 1 "Heating" 2 "Cooling" 3 "Automatic"
B	**Heating or cooling requirement:** 0 "None" 1 "Minimum" 2 "Low" 3 "Medium" 4 "High" 5 "Maximum" 7 "Automatic"
ST	Set flow temperature
M	Specification for set flow temperature is the maximum value.
[ ]	Status of the temperature sensor; see page 70.

Function object CFDM - specification for system or external control

Display	Description
BA	Operating mode; see page 71.
BM	Operating mode; see page 71.
B	Heating or cooling requirement; see page 71.
E	Specification of the function object is exclusive, i.e. demands within the control unit will not be taken into account.
ST	Set system flow temperature
[ ]	Status of the temperature sensor; see page 70.
ML	Set value for minimum system output in % of the rated system output (total rated output of all compressor stages)
ET	Effective set flow temperature, i.e. this set value is used by the system control. This value takes account of demands within the control unit.
[ ]	Status of the temperature sensor; see page 70.
PS	System production status; see Viessmann LON manual.
IT	Actual system flow temperature
[ ]	Status of the temperature sensor; see page 70.
IL	Actual value for minimum system output in % of the rated system output (total rated output of all compressor stages)

Function object DHWC - DHW heating specifications

Display	Description
BA	Operating mode; see page 71.
BM	Operating mode; see page 71.

Control unit diagnostics (cont.)

Display	Description
B	Heating or cooling requirement; see page 71.
C	Demand for DHW heating via external heating circuit controller is present.
ST	Set cylinder temperature
[ ]	Status of the temperature sensor; see page 70.
IT	Actual cylinder temperature
[ ]	Status of the temperature sensor; see page 70.

Page 4

Page 4 displays the values of function objects HCC1 to HCC3 (heating circuits A1 to M2), received via LON.

Function object HCC1, HCC2, HCC3 - internal heating circuit specifications

Display	Description
BA	Operating mode; see page 71.
BM	Operating mode; see page 71.
B	Heating or cooling requirement; see page 71.
E	Exclusive specification, see page 71.
RST	Set room temperature
[ ]	Status of the temperature sensor; see page 70.
VST	Set flow temperature
[ ]	Status of the temperature sensor; see page 70.

Page 5

Page 5 displays the values of function objects PM1 to PM4 (cascade control) received or sent via LON.

Note
Page 5 is only visible if a heat pump cascade is installed via LON and configured.
For heat pump cascades via LON, the lead appliance must have the LON communication module for heat pump cascades installed. If an incorrect LON module is plugged in, fault message ↳BF appears.

Function object PM1, PM2, PM3, PM4 – cascade control

Display	Description
C	Command for starting and stopping the lag heat pump: 1 Off 2 On
BA	LON operating mode (SNVT_hvac_mode); see Viessmann LON manual.
BM	Operating mode; see page 71.
L	■ Set output (s) in % relative to the rated output of the lag heat pump ■ Actual output (s) in % relative to the rated output of the lag heat pump

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Control unit diagnostics (cont.)

Display	Description
VST	Set flow temperature of the secondary circuit of the lag heat pump
[ ]	Status of the temperature sensor; see page 70.

Display	Description
VIT	Actual flow temperature of the secondary circuit of the lag heat pump
[ ]	Status of the temperature sensor; see page 70.

5735 No. external heat pumps

No. lag heat pumps in a cascade.

The control unit supports heat pump cascades which are connected via LON or via external extension H1. Subject to the type of connection (**"Cascade control"**, 700A), three or four lag heat pumps can be controlled.

"0" No lag heat pump installed or appliance itself is a lag heat pump.

"1" to **"3"**
No. lag heat pumps for connection via external extension H1.

"1" to **"4"**
No. lag heat pumps for connection via LON.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"No. of ext. heat p"**

Delivered condition	0
Setting	0 / 1 / 2 / 3 / 4

7000 System diagram

System diagram for heating system.

Select the system diagram during commissioning. The components required for the corresponding diagram are automatically enabled and monitored. 11 different diagrams are available. The following table provides an overview of the possible system diagrams.

7000 System diagram (cont.)

	System diagram											
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Heating circuit												
A1	–	X	X	–	–	X	X	–	–	X	X	–
M2	–	–	–	X	X	X	X	X	X	X	X	–
M3	–	–	–	–	–	–	–	X	X	X	X	–
DHW cylinder	X	–	X	–	X	–	X	–	X	—	X	–
Heating water buffer cylinder	–	○	○	X	X	X	X	X	X	X	X	–
External heat source	–	○*1	○*1	○	○	○	○	○	○	○	○	–
Swimming pool	○	○	○	○	○	○	○	○	○	○	○	–
Solar thermal system (only with Vitosolic 100/200)	○	–	○	–	○	–	○	–	○	–	○	–
Cooling mode (not for type AW)												
A1		○	○			○	○			○	○	
M2				○	○	○	○	○	○	○	○	
M3								○	○	○	○	
Separate cooling circuit	○	○	○	○	○	○	○	○	○	○	○	

*1 *Only in conjunction with the heating water buffer cylinder.*

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7000 System diagram (cont.)

X Required components
○ Optional components


System examples - heat pumps

Note
- *The cooling option can only be used respectively on one heating or cooling circuit.*
- *In addition, the swimming pool and solar options can be freely selected.*
- *The solar option is only feasible in conjunction with the Vitosolic 100 or 200.*

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"System diagram"**

Delivered condition	2
Setting	0 to 11

7001 Language

Language for operating and display elements in the heat pump control unit.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Language"**

Delivered condition	Deutsch
Setting	Different languages

7002 Ave. time outside t

Averaging interval for long-term average outside temperature.

The continuous averaging of actual temperatures reduces the influence of brief temperature fluctuations. The control unit uses the long-term average outside temperature to e.g. calculate the set flow temperature from the heating or cooling curve. If this temperature exceeds or falls below certain limits, the control unit switches between heating and cooling mode.

Note
For other functions, the control unit calculates a short-term average outside temperature with an averaging interval of 2 min.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Ave. time outside t"**

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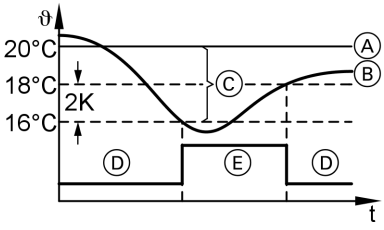
7002 Ave. time outside t (cont.)

Delivered condition	3:00 h	Setting	0:10 to 100:00 h

7003 Temp. diff. heating

Temperature differential for calculating the heating limit.

The heating limit defines the value of the outside temperature, below which central heating commences. This temperature limit results from the set room temperature minus this temperature differential.
Example:
The set room temperature is 20 °C; the temperature entered under **"Temp. diff. heating"** is 4 K.
Central heating commences if the long-term average outside temperature drops below 16 °C (heating limit). If the long-term average outside temperature exceeds 18 °C (because of the specified hysteresis of 2 K).central heating stops.



Ⓐ Set room temperature
Ⓑ Outside temperature (long-term average)
Ⓒ Selected value **"Temp. diff. heating"**
Ⓓ Heating mode OFF
Ⓔ Heating mode ON

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Temp. diff. heating"**

Delivered condition	4 K
Setting	0 to 20 K

7004 Temp. diff. cooling

Temperature differential for calculating the cooling limit.

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7004 Temp. diff. cooling (cont.)

The cooling limit defines the value of the outside temperature, above which cooling mode commences. Similarly to the heating limit, this temperature limit results from the set room temperature plus this temperature differential.

Note
This parameter is only available if cooling mode has been enabled via parameter ***"Cooling"*** *(7100).*

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Temp. diff. cooling"**

Delivered condition	4 K
Setting	1 to 20 K

7005 Red.mode t threshold

Lower temperature limit for "Reduced" operating mode.

If the long-term average outside temperature drops below the specified value, the control unit switches from "Reduced" to "Standard" operating mode (in accordance with EN 12831). As soon as the outside temperature rises 2 K above this temperature limit, "Reduced" operating mode is re-enabled.

Note
This function is disabled at setting -40 °C.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Red.mode t threshold"**

Delivered condition	-40 °C
Setting	-40 to 60 °C

7006 Frost protection t

Lower temperature limit for frost protection function.

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7006 Frost protection t (cont.)

If the outside temperature drops below this frost protection limit, the heat pump control unit switches to frost protection mode. Standard mode with the stored switching times is not re-enabled until the outside temperature rises 2 K above the frost protection limit.

Note
The frost protection function is independent of the operating mode selector position.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Frost protection t"**

Delivered condition	1 °C
Setting	-15. to 15 °C

7007 Primary pump with NC

Switching state of the primary pump for natural cooling function.

The setting depends on the system diagram selected.

"Yes" Pump starts.
"No" Pump does not start.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Primary pump with NC"**

Delivered condition	Yes
Setting	Yes/No

7008 Swimming pool

Swimming pool heating.

"Yes" Swimming pool is connected and will be heated.
"No" Swimming pool will not be heated.

7008 Swimming pool (cont.)

Note
*The thermostat for swimming pool temperature control is connected to the heat pump control unit via external extension H1. Therefore initially set parameter **"External extension"** (7010) to **"Yes"**. If this has not been done, parameter **"Swimming pool"** is not displayed.*

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Swimming pool"**

Delivered condition	No
Setting	Yes/No

700A Cascade control

Control of heat pump cascades.

The heat pump control unit enables a cascade with up to four lag heat pumps to be controlled via two different communication interfaces.

"0" No lag heat pump control; appliance can work as a lag heat pump.
"1" Control via external extension H1 (max. 3 lag heat pumps)
"2" Control via LON (max. 4 lag heat pumps)

Note
*With setting **"1"** or **"2"**, the heat pump is the lead appliance. The number of lag heat pumps is set with parameter **"No. of ext. heat p"** (5735).*
*If the appliance is to work as a lag heat pump, the value for this parameter must be **"0"**, and simultaneously the value **"11"** must be selected for parameter **"System diagram"** (7000).*

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Cascade control"**

Delivered condition	0
Setting	0 / 1 / 2

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700B Output of lag heat pumps

Average output of the lag heat pumps in a cascade, connected via external extension H1.

This output information is used by the load manager in the control unit to start and stop the lag heat pumps efficiently.

Note
*For heat pump cascades via LON, the output is specified at the control unit of every individual lag heat pump (parameter **"Output"**, 5030).*

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Output lag heat pump"**

Delivered condition	10 kW
Setting	0 to 255 kW

700D Ext.heat p f. cool

Using lag heat pumps for active cooling function.

"Yes" Lag heat pumps are used.
"No" Lag heat pumps are not used.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Ext. heat p f. cool"**

Delivered condition	No
Setting	Yes/No

700E Ext.heat p for DHW

Enabling the lag heat pumps for DHW heating.

"Yes" Lag heat pumps in the cascade are used for DHW heating.
"No" No lag heat pumps are used.

Note
*Enabling or blocking always applies to **all** lag heat pumps.*

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Ext. heat p for DHW"**

Delivered condition	No
Setting	No/Yes

7010 External extension

External extension H1 installed.

"Yes" External extension H1 is installed and enabled.
"No" External extension H1 is not enabled.

External extension H1 can be used for **one** of the following functions:
- Swimming pool water heating
- Heat pump cascade
- External operating mode changeover
- External demand
- External mixer OPEN
- External blocking
- External mixer CLOSE

Note
The functions listed can only be used if further parameters are set accordingly.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"External extension"**

Delivered condition	No
Setting	Yes/No

7011 Op. mode change HC

Assigning external operating mode changeover via signal "External demand / mixer OPEN".

This parameter specifies which system components the external operating mode changeover will affect. With the external operating mode changeover, a heating circuit with mixer for example can be switched via a remote monitoring system from "Reduced" to "Standard" operating mode.

"0" DHW heating
"1" A1: Heating circuit without mixer
"2" A1: Heating circuit without mixer, DHW heating
"3" M2: Heating circuit with mixer
"4" M2: Heating circuit with mixer, DHW heating
"5" A1: Heating circuit without mixer
M2: Heating circuit with mixer
"6" A1: Heating circuit without mixer
M2: Heating circuit with mixer, DHW heating
"7" M2: Heating circuit with mixer
M3: Heating circuit with mixer
"8" M2: Heating circuit with mixer
M3: Heating circuit with mixer, DHW heating
"9" A1: Heating circuit without mixer
M2: Heating circuit with mixer
M3: Heating circuit with mixer

7011 Op. mode change HC (cont.)

"10" A1: Heating circuit without mixer
M2: Heating circuit with mixer
M3: Heating circuit with mixer, DHW heating

"11" No heating circuit or DHW heating changeover. **Operating mode changeover disabled**; function "External demand" only.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Op. mode change HC"**

Delivered condition	11
Setting	0 to 11

7012 Op mode change eff.

Effect of external operating mode changeover via signal "External demand / mixer OPEN".

This parameter specifies which operating mode is started for the system components defined by **"Op. mode change HC"** (7011) via the external operating mode changeover.

Note
*This parameter only has an effect if the external operating mode changeover is enabled (**"Op. mode change HC"** is set to a value between **"0"** and **"10"**).*

"0" "Standby" operating mode or "OFF"

"1" "Reduced" or "Top" operating mode

"2" "Standard" operating mode

"3" "Fixed value" or "Second temperature" operating mode

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Op mode change eff."**

Delivered condition	2
Setting	0 / 1 / 2 / 3

7013 Op. mode change time

Duration of external operating mode changeover via signal "External demand / mixer OPEN".

7013 Op. mode change time (cont.)

After this time has expired, the control unit switches back to the operating mode which was enabled before the external changeover. This also occurs if party mode was enabled in the meantime.

Note
*This parameter only has an effect if the external operating mode changeover is enabled (**"Op. mode change HC"** is set to a value between **"0"** and **"10"**).*

"0" Changeover is only carried out as long as signal "External demand / mixer OPEN" is available.

"1" to **"12"**
Duration of the operating mode changeover in hours, starting with the activation of the external operating mode changeover.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Op. mode change time"**

Delivered condition	8 h
Setting	0 to 12 h

7014 External demand / mixer OPEN

Assignment and effect of signal "External demand / mixer OPEN".

This parameter specifies how the signal affects the individual system components. For an external demand, the heat pump for example is started and the heating circuit mixers are simultaneously moved to a certain position.

Note
The effect of signal "External demand/ mixer OPEN" lasts for as long as the signal is present at connections 1X3.12 and 1X3.13.

"0" M2/M3: Heating circuits with mixer – control mode
No heat demand to the heat pump

"1" M2: Heating circuit with mixer – mixer "OPEN"
M3: Heating circuit with mixer – control mode
No heat demand to the heat pump

"2" M2: Heating circuit with mixer – control mode
M3: Heating circuit with mixer – mixer "OPEN"
No heat demand to the heat pump

"3" M2/M3: Heating circuits with mixer – mixer "OPEN"
No heat demand to the heat pump

7014 External demand / mixer OPEN (cont.)

"4" M2/M3: Heating circuits with mixer – control mode
Heat demand to the heat pump

"5" M2: Heating circuit with mixer – mixer "OPEN"
M3: Heating circuit with mixer – control mode
Heat demand to the heat pump

"6" M2: Heating circuit with mixer – control mode
M3: Heating circuit with mixer – mixer "OPEN"
Heat demand to the heat pump

"7" M2/M3: Heating circuits with mixer – mixer "OPEN"
Heat demand to the heat pump

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Ext.demand/Miopen"**

Note
*Parameter **"Ext. blocking/Miclose"** (7015) has higher priority than **"Ext. demand/Miopen"** (7014).*

Delivered condition	4
Setting	0 to 7

7015 External blocking/Miclose

Assignment and effect of signal "External blocking/mixer closed".

This parameter specifies how the signal affects the individual system components. For an external blocking signal, the heat pump for example is stopped and the heating circuit mixers are simultaneously moved to the "CLOSED" position.

Note
The effect of signal "External demand/mixer CLOSED" lasts for as long as the signal is present at connections 1X3.2 and 1X3.14.

Please note
Since the heat pump can be permanently blocked via signal "External demand/mixer CLOSED", frost protection in this case is not ensured.

"0" M2/M3: Heating circuits with mixer – control mode
No heat pump blocking

"1" M2: Heating circuit with mixer – mixer "CLOSED"
M3: Heating circuit with mixer – control mode
No heat pump blocking

7015 External blocking/Miclose (cont.)

"2" M2: Heating circuit with mixer – control mode
M3: Heating circuit with mixer – mixer "CLOSED"
No heat pump blocking

"3" M2/M3: Heating circuits with mixer – mixer "CLOSED"
No heat pump blocking

"4" M2/M3: Heating circuits with mixer – control mode
Heat pump blocking

"5" M2: Heating circuit with mixer – mixer "CLOSED"
M3: Heating circuit with mixer – control mode
Heat pump blocking

"6" M2: Heating circuit with mixer – control mode
M3: Heating circuit with mixer – mixer "CLOSED"
Heat pump blocking

"7" M2/M3: Heating circuits with mixer – mixer "CLOSED"
Heat pump blocking

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Ext.blocking/Miclose"**

Note
*Parameter **"Ext. blocking/Miclose"** (7015) has higher priority than **"Ext. demand/Miopen"** (7014).*

Delivered condition	4
Setting	0 to 8

7016 Type Vitosolic

Control unit type for solar circuit.

This parameter specifies which control unit is used for the solar circuit.

"0" No solar control unit
"1" Vitosolic 100
"2" Vitosolic 200

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Vitosolic type"**

Delivered condition	0
Setting	0 / 1 / 2

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7017 Vitocom 100

Using the Vitocom 100 communication interface.

The connection is made via KM BUS.

"Yes" Vitocom 100 is installed and enabled.
"No" Vitocom 100 is not used.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Vitocom 100"**

Delivered condition	No
Setting	Yes/No

7018 Value range 0..10 V

Temperature range of input 0..10 V.

The range begins at 0 °C and continues linearly to the specified value.
Example:
A value of 80 results in a temperature range of 0 to 80 °C, i.e. 5 V correspond to 40 °C and 7.5 V to 60 °C.

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Value range 0..10 V"**

Delivered condition	100 °C
Setting	0 to 100 °C

7019 Priority ext. demand

Priority of signal "External demand / mixer OPEN".

"0" Low priority:
Heating and cooling demands from the heating circuits have priority, e.g. over a demand for swimming pool heating.

"1" High priority:
External demand, e.g. swimming pool heating, has priority over the heating circuits. Priority over DHW heating is only enabled if parameter **"DHW priority"** (6010) is simultaneously set to **"No"**. This enables e.g. the operation of a DHW cylinder at the swimming pool connection.

7019 Priority ext. demand (cont.)

"2" Low priority:
As per setting value **"0"**, but lag heat pumps are also used to generate heat.

"3" High priority:
As per setting value **"1"**, but lag heat pumps are also used to generate heat.

Note
*If necessary, auxiliary heat sources are also used for heating at setting **"1"** and **"3"**.*

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Priority ext. demand"**

Delivered condition	0
Setting	0 / 1

701A Ext. blocking effect

Effect of signal "External blocking/mixer closed" on the pumps.
The setting values effect pump blocking according to the following table.

Value	Secondary pump/ compressor blocked	Cylinder pump blocked	Heating circuit pump M3 blocked	Heating circuit pump M2 blocked	Heating circuit pump A1 blocked
"0"					
"1"					x
"2"				x	
"3"				x	x
"4"			x		
"5"			x		x
"6"			x	x	
"7"			x	x	x
"8"		x			
"9"		x			x
"10"		x		x	
"11"		x		x	x
"12"		x	x		
"13"		x	x		x
"14"		x	x	x	
"15"		x	x	x	x

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701A Ext. blocking effect (cont.)

Value	Secondary pump/ compressor blocked	Cylinder pump blocked	Heating circuit pump M3 blocked	Heating circuit pump M2 blocked	Heating circuit pump A1 blocked
"16"	x				
"17"	x				x
"18"	x			x	
"19"	x			x	x
"20"	x		x		
"21"	x		x		x
"22"	x		x	x	
"23"	x		x	x	x
"24"	x	x			
"25"	x	x			x
"26"	x	x		x	
"27"	x	x		x	x
"28"	x	x	x		
"29"	x	x	x		x
"30"	x	x	x	x	
"31"	x	x	x	x	x

Menu
- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Ext. blocking effect"**

Delivered condition 0
Setting 0 to 31

701B Wtimer DHW Circ.

Time program for the appliance connected to the auxiliary output, e.g. DHW circulation pump for DHW circuit.

Time program setting
Operating instructions

Operating modes for auxiliary output
"OFF"
Appliance is switched off.

"15/5 cycles"
Appliance runs every 15 min for 5 min.

"30/5 cycles"
Appliance runs every 30 min for 5 min.

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701B Wtimer DHW Circ. (cont.)

"ON"

Appliance operates continuously.

Note

*The connected appliance is stopped during DHW cylinder heating. When the auxiliary function (**"Auxiliary function"**, 600B) is enabled, the control unit only starts the appliance shortly before the second set temperature (**"Set temp. 2"**, 600C) is reached.*

Menu

- **"Device settings"**
- **"Programming"**
- **"System definition"**
- **"Wtimer DHW Circ."**

Delivered condition	Off
Setting	OFF / 15/5 cycles / 30/5 cycles / On

5366 335 GB

Compressor control settings

The control settings for the compressor are explained below.

Parameters with the numbers 50xx always relate to the first compressor stage, whereas the numbers 51xx describe the identical parameters of the second compressor stage.

Note
Parameters of the second compressor stage are only visible in the control unit if this stage is available and has also been activated in the control unit via parameter 5100.

5000 Enabling

Enabling the compressor stage.

"Yes" Compressor stage is used.
"No" Compressor stage is not used, e.g. in case of a fault.

Note
*To enable compressor stage 2, parameter 5100 must be set to **"Yes"**.*

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Release"**

Delivered condition	Yes
Setting	Yes/No

5001 Max. flow temp

Secondary circuit maximum flow temperature.

Please note
Flow temperatures which are too high can cause appliance damage.
Never set the maximum flow temperature higher than specified for the corresponding type (see following table).

5001 Max. flow temp (cont.)

	Part number Heat pump module	Max. flow temperature Secondary circuit
Vitocal 300-G	7284608, 7284609, 7284610, 7284611, 7344657, 7283149	60 °C
Vitocal 300-A	All	60 °C

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Max. flow temp"**

Delivered condition	60 °C
Setting	25 to 65 °C

5002 Min. return temp.

Secondary circuit minimum return temperature.

If the value falls below this temperature, the control unit does not start the compressor, but rather starts booster heaters, such as the instantaneous heating water heater or external heat source. The booster heaters remain on until the minimum return temperature exceeds the specified value.

Note
The control unit only monitors this parameter when starting the compressor, but not while it is running.
If the minimum return temperature has been set too low, there is more compressor wear due to the more frequent low-pressure shutdowns. If this temperature has been set too high, the proportion of booster heaters increases and the efficiency of the heat pump drops. This problem occurs primarily when heating up a cold building.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Min. return temp."**

Delivered condition	5 °C
Setting	1 to 40 °C

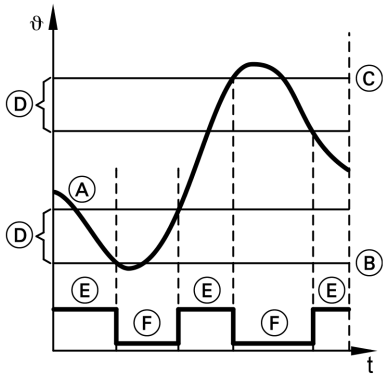
5366 335 GB

5004 Hysteresis primary

Primary circuit temperature range for starting and stopping the heat pump.

The heat pump starts
- if the primary inlet temperature exceeds the value **"Min. t primary inlet"** (5016) by **"Hysteresis primary"** (5004).
- if the primary inlet temperature falls below the value **"Max. t primary inlet"** (5015) by **"Hysteresis primary"** (5004).

The heat pump stops
- if the primary inlet temperature falls below the value **"Min. t primary inlet"** (5016).
- if the primary inlet temperature exceeds the value **"Max. t primary inlet"** (5015).



Ⓐ inlet temperature
Ⓑ **"Min. T primary in"**
Ⓒ **"Max. t primary inlet"**
Ⓓ **"Hyst. primary"**
Ⓔ Heat pump ON
Ⓕ Heat pump OFF

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Hyst. primary"**

Delivered condition	
-Vitocal 300-G	5 K
-Vitocal 300-A	1 K
Setting	1 to 20 K

5005 Min. runtime

Compressor minimum runtime.

5005 Min. runtime (cont.)

This function reduces the wear on moving parts of the compressor. The compressor will only stop after this time has expired. The control unit uses the signal "Critical draw-off" to make the consumers draw off heat (see page 123).

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Min. runtime"**

Delivered condition	2:00 min
Setting	2:00 to 30:00 min

5006 Min. pause

Minimum compressor pause between two operating phases.

This function reduces the wear on moving parts of the compressor and the electronic full wave soft starter. We recommend that you never exceed four starts per hour.

Note
To prevent damage to appliance with full wave soft starter, the value must not be lower than 10 min.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Min. pause"**

Delivered condition	10:00 min
Setting	0:20 to 30:00 min

5008 Start delay

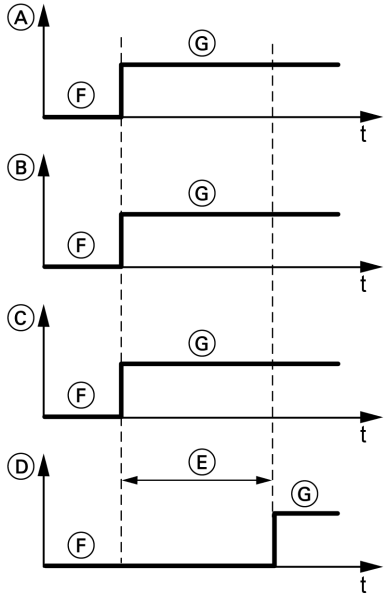
Start time before compressor start to switch on pumps or fans.

Before the compressor starts,
- the primary pump or fan must already be running, so the primary temperature can be reliably calculated. For water/water heat pumps, the flow limiter must also deliver a permanent signal.
- the secondary pump must be running, so the secondary circuit return temperature can be reliably measured.

The individual components are started after the start signal in accordance with the following diagram, where Ⓔ corresponds to the specified value.

5366 335 GB

5008 Start delay (cont.)



Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Start delay"**

Delivered condition	2:00 min
Setting	0:10 to 16:40 min

Ⓐ Start signal for heat pump
Ⓑ Primary pump or fan
Ⓒ Secondary pump
Ⓓ Compressor
Ⓔ Start delay
Ⓕ Off
Ⓖ On

500A Optimum runtime

Optimum compressor runtime.

5366 335 GB

500A Optimum runtime (cont.)

Brine/water heat pumps

Due to the permanent energy extraction in brine/water heat pumps, compressor runtimes which are too long can lower the temperature of the geothermal probe so far that the efficiency is reduced. This depends on the primary circuit version and the heat transfer in the ground.

The optimum operating range is the time during which the coefficient of performance (COP) over time is almost linear. The optimum runtime is the time from the compressor start to the end of the optimum operating range.

Ⓐ Optimum operating range
Ⓑ Primary temperature drop
Ⓒ Optimum runtime

Air/water heat pumps

For compressors with regulated output, the control unit lowers the set output far enough that the stop criteria are met only when the optimum runtime is reached.
For air/water heat pumps, the optimum runtime is permanently set to 20 min after the end of the defrost process. This way, the heat extracted during defrosting with the circuit reversal is fed back into the heating system.

Note
If the compressor has been running for 15 min, the meter inside the control unit for low pressure and control high pressure shutdowns is additionally reset. If eight shutdowns occur within 24 hours, and the 15-minute runtime is not reached once, the control unit displays a fault message (↳A9).

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Optimum runtime"**

Delivered condition	2:00 min
Setting	0:20 to 18:00 min

5366 335 GB

500B Defrost time

Max. time for defrosting the evaporator in air/water heat pumps.

During the defrost time, the heat pump does not generate any heating energy.

One of the following conditions must be met for the defrost process to end:
- **"Defrost time"** (500B) duration is exceeded.
- Temperature **"Defrost stop t"** (5010) is exceeded.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Defrost time"**

Delivered condition	30 min
Setting	0:10 to 59:50 min

500C Max. defrost start time

Time delay for the start of the defrost process of air/water heat pumps. The defrost process does not start immediately after the demand, but only after the time delay has expired.

If the hot gas temperature exceeds 80 °C, the defrost process also starts before this time has expired. If the value for defrost start is 0 s, the defrost process starts immediately after the demand, independent of the hot gas temperature.

To start the defrost process, the following conditions must be met:
- Time delay **"Max. defrost start time"** (500C) is exceeded.
- Blocking time **"Defrost OFF time"** (500D) is exceeded.
- Temperature differential **"Temp. diff. defrost"** (500E) is exceeded.
- The value falls below temperature **"Defrost start t"** (500F).

Note
During this time, the control unit stops the secondary pump, although the compressor continues to run. This way, the pressure required for the defrost process is built up, particularly for appliance with hot gas defrost.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Max. defrost start time"**

Delivered condition	0 min
Setting	0 to 600 min

5366 335 GB

500D Defrost OFF time

Blocking time for renewed defrosting of the evaporator in air/water heat pumps.

The specified blocking time begins from the end of the last defrost process.

To start the defrost process, the following conditions must be met:
- Time delay **"Max. defrost start time"** (500C) is exceeded.
- Blocking time **"Defrost OFF time"** (500D) is exceeded.
- Temperature differential **"Temp. diff. defrost"** (500E) is exceeded.
- The value falls below temperature **"Defrost start t"** (500F).

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Defrost OFF time"**

Delivered condition	1:30 min
Setting	0:00 to 4:00 min

500E Temp. diff. defrost

Temperature differential for the start of the defrost process of air/water heat pumps.

The defrost process only starts if the differential between inlet and evaporator temperature exceeds the specified value.

To start the defrost process, the following conditions must be met:
- Time delay **"Max. defrost start time"** (500C) is exceeded.
- Blocking time **"Defrost OFF time"** (500D) is exceeded.
- Temperature differential **"Temp. diff. defrost"** (500E) is exceeded.
- The value falls below temperature **"Defrost start t"** (500F).

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Temp. diff. defrost"**

Delivered condition	3 K
Setting	0.5 to 30 K

5366 335 GB

500F Defrost start t

Evaporator temperature for the start of the defrost process of air/water heat pumps.

The defrost process only starts if the evaporator temperature falls below the specified value.

To start the defrost process, the following conditions must be met:
- Time delay **"Max. defrost start time"** (500C) is exceeded.
- Blocking time **"Defrost OFF time"** (500D) is exceeded.
- Temperature differential **"Temp. diff. defrost"** (500E) is exceeded.
- The value falls below temperature **"Defrost start t"** (500F).

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Defrost start t"**

Delivered condition	0 °C
Setting	-20 to +20 °C

5010 Defrost stop t

Evaporator temperature for the end of the defrost process of air/water heat pumps.

The defrost process ends if the evaporator temperature exceeds the specified value.

To end the defrost process, the following conditions must be met:
- **"Defrost time"** (500B) duration is exceeded.
- Temperature **"Defrost stop t"** (5010) is exceeded.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Defrost stop t"**

Delivered condition	20 °C
Setting	0 to 70 °C

5011 Max. differential t

Max. permissible differential between evaporator and condenser temperature.

5366 335 GB

5011 Max. differential t (cont.)

If this temperature differential exceeds the specified value, the compressor shuts down.

Note
The control unit calculates the required temperature values from the pressure values measured at the evaporator and condenser. If these values are not available, the temperature values are calculated from the characteristics of the heat exchanger, and the inlet and outlet temperatures.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Max. differential t"**

Delivered condition	
-Vitocal 300-G	70 K
-Vitocal 300-A	65 K
Setting	10 to 100 K

5012 DHW with heat pump

Enabling the heat pump for DHW heating.

"Yes"	Heat pump is enabled for DHW heating.
"No"	Heat pump is not enabled for DHW heating.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"DHW with heat pump"**

Delivered condition	Yes
Setting	Yes/No

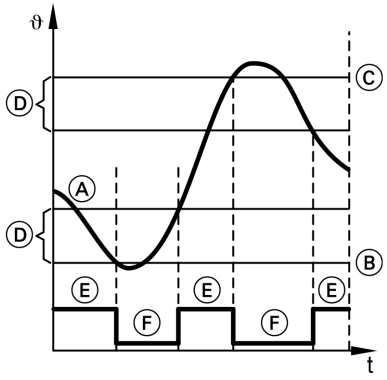
5015 Max. t primary inlet / 5016 Min. t primary inlet

Maximum/minimum primary inlet temperature for starting and stopping the heat pump.

5015 Max. t primary inlet 🔒 / 5016 Min. t primary . . . (cont.)

The heat pump starts
- if the primary inlet temperature exceeds the value **"Min. t primary inlet"** (5016) by **"Hysteresis primary"** (5004).
- if the primary inlet temperature falls below the value **"Max. t primary inlet"** (5015) by **"Hysteresis primary"** (5004).

The heat pump stops
- if the primary inlet temperature falls below the value **"Min. t primary inlet"** (5016).
- if the primary inlet temperature exceeds the value **"Max. t primary inlet"** (5015).



Ⓐ inlet temperature
Ⓑ **"Min. T primary in"**
Ⓒ **"Max. t primary inlet"**
Ⓓ **"Hyst. primary"**
Ⓔ Heat pump ON
Ⓕ Heat pump OFF

Note
The fans and compressors in air/water heat pumps only start if the short-term average outside temperature (averaging interval 2 min) is also below the maximum primary inlet temperature.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Max. t primary inlet"** or **"Min. t primary inlet"**

Maximum primary inlet temperature

Delivered condition	
-Vitocal 300-G	20 °C
-Vitocal 300-A	35 °C
Setting	0 to 50 °C

Minimum primary inlet temperature

Delivered condition	
-Vitocal 300-G	3 °C
-Vitocal 300-A	-20 °C
Setting	-20 to +20 °C

5366 335 GB

5019 Superheating

Suction gas - set superheating temperature.

The temperature of the suction gas is raised to prevent the compressor drawing in any drops of liquid. This is carried out by optimising the expansion valve control and/or by an intermediate heat exchanger.
If this value cannot be reached in operation, the EEV controller optimisation algorithm matches the set value specified here until superheating is almost constant. The end value for automatic set value matching is 6 K.

Note
Changing the parameters is appropriate if, for example, refrigerant superheating in the evaporator should be adjusted.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Superheating"**

Delivered condition	3 K
Setting	3 to 25.5 K

501A MOP limit

Maximum evaporator operating pressure (MOP).

If the pressure in the evaporator exceeds this value, the control unit switches from superheating to suction pressure control. After the pressure has dropped below this value, the control unit resets the original state.
In the delivered condition, the values for the various heat pumps are different. The maximum value that can be set depends on the application limit of the compressor used.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"MOP limit"**

Delivered condition	6.6 bar(a)
Setting	0.2 to 19 bar (a)

501B EVI hot gas temp.

Set hot gas temperature for heat pumps with EVI vapour injection ("Enhanced Vapour Injection").

5366 335 GB

501B EVI hot gas temp. (cont.)

The EVI control circuit uses the injected vapour volume as the manipulated variable for controlling the hot gas temperature. If the hot gas temperature here falls below the specified set value, more vapour is injected, and if it exceeds it, the vapour volume is reduced.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"EVI hot gas temp."**

Delivered condition	68 °C
Setting	40 to 150 °C

501C Compr.diff.dead zone

Dead zone of the set temperature differential **"EVI superheating"** (501D) to start the EVI vapour injection.

The **"Compr.diff.dead zone"** determines a fluctuation range around the set temperature differential **"EVI superheating"** (501D), within which the vapour injection is neither started nor stopped. If the differential between the suction gas and evaporation temperature fluctuates around the set value, this prevents the vapour injection starting and stopping too frequently.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Compr.diff.dead zone"**

Delivered condition	8 K
Setting	2 to 25.5 K

501D EVI superheating

Set temperature differential for start of the EVI vapour injection.

For an efficient vapour injection, the suction gas must be significantly cooler than the injected vapour. If the differential between the suction gas and vapour temperature exceeds the value specified here, the vapour injection starts.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"EVI superheating"**

Delivered condition	6 K
Setting	3 to 25.5 K

5366 335 GB

501E PWM cycle time

Cycle time for the compressor output control.

The output of modulating heat pumps is matched through the cyclic change between compressor delivery and idle phases. This process is controlled via pulse width modulation (PWM).
A complete PWM cycle consists of one compression and one idle phase. The ratio of delivery to cycle time is the compressor performance ratio. The minimum performance ratio is 30%.
The **"PWM cycle time"** influences the response characteristics of the output control.
Example:
The control unit demands 40% of the compressor output and the set cycle time is 20 s. This means the delivery time is 8 s and the idle phase lasts 12 s. If the cycle time is set to 8 s, the delivery time in this case is 3.2 s and the idle time 4.8 s.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"PWM cycle time"**

Delivered condition	20 s
Setting	10 to 20 s

501F Opening position

Electronic expansion valve (EEV) opening in the compressor start phase.

The electronic expansion valve opening partially over a defined period ensures an adequate supply of refrigerant to the compressor. This is required particularly in the compressor start phase, when switching over from heating to cooling mode, and at the beginning and end of the defrost process.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Opening position"**

Delivered condition	30%
Setting	10 to 100%

5020 Start open duration

Period for the electronic expansion valve (EEV) opening in the compressor start phase.

5020 Start open duration (cont.)

The electronic expansion valve opening partially over a defined period ensures an adequate supply of refrigerant to the compressor. This is particularly important in the compressor start phase, when switching over from heating to cooling mode, and at the beginning and end of the defrost process.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Start open duration"**

Delivered condition	5 s
Setting	1 to 30 s

5021 Max. hot gas temp.

Upper hot gas temperature limit.

If the hot gas temperature exceeds this limit for longer than 30 s, the compressor shuts down.

! **Please note**
Hot gas temperatures which are permanently too high destroy the compressor.
Never set the **"Max. hot gas temp."** higher than necessary.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Max. hot gas temp."**

Delivered condition	130 °C
Setting	100 to 140 °C

5022 Max. high pressure

Upper condensation pressure limit.

If the hot gas pressure exceeds the specified value, the compressor shuts down (high pressure shutdown). In the delivered condition, the upper pressure limit for the various heat pumps is different.

! **Please note**
Condensation pressures which are permanently too high destroy the compressor.
Never set the **"Max. high pressure"** higher than necessary.

Menu
- **"Device settings"**
- **"Programming"**

5022 Max. high pressure (cont.)

- **"Compressor"**
- **"Max. high pressure"**

Delivered condition	27.7 bar(a)
Setting	10 to 50 bar(a)

5023 High p dead zone

Dead zone around upper condensation pressure limit.

After a high pressure shutdown, the compressor does not restart until the condensation pressure exceeds the pressure limit **"Max. high pressure"** (5022) by **"High p dead zone"** (5023).

Note
*An additional criterion for the compressor restart is **"Min. pause"** (see page 94).*

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"High p dead zone"**

Delivered condition	5 bar
Setting	1 to 20 bar

5024 Max. superheat t

Suction gas - max. superheating temperature.

If the suction gas superheating exceeds the specified value, the compressor shuts down (see page 102).

Note
The compressor also shuts down as soon as the suction gas superheating temperature falls below 0.5 K.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Max. superheat t"**

Delivered condition	
-Vitocal 300-G	20 K
-Vitocal 300-A	30 K
Setting	6 to 50 K

5366 335 GB

5025 Low pressure limit

Suction gas - lower pressure limit (low pressure limit).

If the suction gas pressure falls below the specified value, the compressor shuts down (low pressure shutdown). In the delivered condition, different pressure limits are set for the various types of heat pump, subject to the compressor used.

Please note
Suction gas pressures which are permanently too low destroy the compressor. Never set the **"Low pressure limit"** lower than necessary.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Low pressure limit"**

Delivered condition	
-Vitocal 300-G	2.2 bar(a)
-Vitocal 300-A	1.9 bar(a)
Setting	0 to 10 bar(a)

5026 Hysteresis low p

Hysteresis for restarting after a low pressure shutdown.

After a low pressure shutdown, the compressor does not restart until the suction gas pressure exceeds the **"Low pressure limit"** (5025) by the value **"Hysteresis low p"**.

Note
*An additional criterion for the compressor restart is **"Min. pause"** (see page 94).*

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Hysteresis low p"**

Delivered condition	1.5 bar
Setting	0 to 2 bar

5027 Low pressure delay

Delay for low pressure shutdown.

5027 Low pressure delay (cont.)

In some heat pump operating states, such as the compressor start phase, the suction gas pressure often briefly falls below the lower limit. This is suppressed within the specified delay so a low pressure shutdown is not carried out immediately.
Further possible operating states in which the suction gas briefly falls below the lower pressure limit:

- Change between heating/cooling mode
- Start and end of the defrost process for air/water heat pumps

Menu

- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Low pressure delay"**

Delivered condition	10 s
Setting	0 to 127 s

5030 Output

Type-dependent heating output - compressor stage 1.

- **Refrigerant circuit statement**
  The control unit calculates the actual compressor power consumption from the type-dependent heating output and the internal output curves.
  From the pressures and temperatures in the refrigerant circuit, the control unit calculates the heating output.
  The ratio of transferred heating output to consumed electric output gives the coefficient of performance (COP).
  The control unit calculates both output values over a month and stores the result.
- **Starting several compressor stages or lag heat pumps**
  For known output values, the control unit can optimally start and stop multi-stage heat pumps and lag heat pumps in cascades, for efficient operation.

Calculating type-dependent output values
Technical guides for heat pumps

Example:

Heat pump	Type-dependent heating output
Vitocal 300-G, type WW/WWC 108	8 kW
Vitocal 300-G, Type BW/BWC 114	14 kW
Vitocal 300-A, all types	10 kW

Note
Pressing "Standard settings" [>I<], or "Reset" [ ] in the main menu, returns the output information to the delivered condition.
The output of compressor stage 2 is specified via parameter 5130.

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5030 Output (cont.)

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Output"**

Delivered condition	10 kW
Setting	1 to 255 kW

5707 Number of heat pumps

Heat pump number in a cascade via LON.

The heat pumps within a cascade via LON must be uniquely identifiable for communication. This is achieved by specifying a unique number.

Note
Numbers within a cascade via LON may not be assigned more than once. Lag heat pumps connected via external extension H1 do not need to be assigned a number. This parameter then has no effect.

Menu
- **"Device settings"**
- **"Programming"**
- **"Compressor"**
- **"Number of heat pumps"**

Delivered condition	1
Setting	1 / 2 / 3 / 4

5366 335 GB

7B00 Ext. heat source

Enabling external heat sources.

If there is a corresponding heat demand, the external heat source can be additionally started by the control unit. The heating water circuit of the external heat source is fed into the secondary flow via a mixer.

"Yes" External heat source, e.g. oil fired condensing boiler is enabled.
"No" External heat source is not used.

Menu
- **"Device settings"**
- **"Programming"**

- **"Ext. heat source"**
- **"Ext. heat source"**

Note
*If the system diagram selected contains an external heat source, this must initially be enabled for use with **"Yes"**. The remaining parameters for the external heat source only then become visible as well.*

Delivered condition	No
Setting	Yes/No

7B01 Priority

Priority of the external heat source over the instantaneous heating water heater.

"Yes" External heat source has priority.
"No" Instantaneous heating water heater has priority.

Menu
- **"Device settings"**
- **"Programming"**

- **"Ext. heat source"**
- **"Priority"**

Delivered condition	Yes
Setting	Yes/No

7B02 Dual-mode temperature

Outside temperature limit for operation of the external heat source.

7B02 Dual-mode temperature (cont.)

If the long-term average outside temperature falls below the dual-mode temperature, the control unit enables operation of the external heat source. Requirement: Parameter **"Ext. heat source"** (7B00) is set to **"Yes"**, and the heat pump and/or other heat sources cannot meet the current heat demand alone.
Above the dual-mode temperature, the heat pump control unit only starts the external heat source under special circumstances, e.g. a heat pump fault.

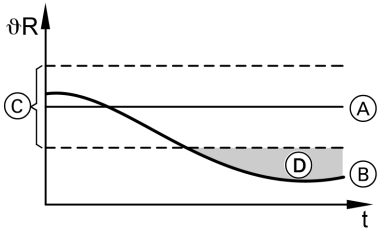
Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Dual-mode temperature"**

Delivered condition	10 °C
Setting	–50 to +50 °C

7B03 Threshold

Start threshold for external heat source.

To prevent the external heat source starting immediately if the set system flow temperature is not reached for a short time, the control unit uses the integral of duration and level of deviation from the set to actual temperature as start criteria. The specified value is the grey area between the actual temperature curve with the hysteresis of the system flow temperature, and therefore has the unit K·min (see page 138).



Ⓐ Set control temperature
Ⓑ Actual temperature
Ⓒ Hysteresis of the system flow temperature
Ⓓ **"Threshold"**

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Threshold"**

Delivered condition	300 K·min

7B03 Threshold (cont.)

Setting	10 to 30000 K·min

7B04 Delay

Start delay for the external heat source.

The external heat source does not start within the specified period following matching of the set flow temperature in the secondary circuit. This occurs e.g. when changing the operating mode "Standard"/"Reduced" or after switching "Central heating"/ "DHW heating".

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Dwell time"**

Delivered condition	30 min
Setting	0 to 300 min

7B05 Mixer t limit

Lower flow temperature limit to open the mixer.

Flow temperature which the external heat source must reach after every start, before the mixer opens. During operation, the flow temperature can fall below this value without the mixer closing.

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Mixer t limit"**

Delivered condition	0 °C
Setting	0 to 80 °C

7B06 Min. runtime

External heat source minimum runtime.

5366 335 GB

7B06 Min. runtime (cont.)

The external heat source does not stop during this period. The control unit cannot reset the demand signal until the minimum runtime has expired.

Note
The runtime cannot be less than the specified minimum.

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Min. runtime"**

Delivered condition	20 min
Setting	0 to 1440 min

7B07 Runtime without demand

Run-on time of the external heat source without demand.

If there is no longer any heat demand from the heating system, the heat pump control unit lets the external heat source run on until one of the following conditions is met:
- External heat source flow temperature reaches temperature limit to open the mixer (**"Mixer t limit"**, 7B05).
- **"Runtime without request"** is reached.

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Runtime without demand"**

Delivered condition	10 min
Setting	5 to 1440 min

7B08 Mixer runtime

Period for the mixer to completely switch between two operating states (angle range 90°).

This value is a property of the mixer motor and can be found in the associated specification. If the specified time for the mixer used is too short, this can lead to the mixer "oscillating".

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Mixer runtime"**

Delivered condition	2:05 min

7B08 Mixer runtime (cont.)

Setting	0:05 to 4:15 min

7B09 Mixer active zone / 7B0A Mixer dead zone

External heat source - mixer active zone/dead zone.

The dead zone (switching point interval) determines the fluctuation range around the set flow temperature, in which the mixer does not react (is at zero volt).
Outside the dead zone, the mixer adjusts its set position subject to the temperature differential.
The active zone specifies the sensitivity of the mixer control from the temperature deviation. A high value results in a rapid response.

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Mixer active zone"** / **"Mixer dead zone"**

Active zone

Delivered condition	4 K
Setting	2 to 40 K

Dead zone

Delivered condition	1 K
Setting	0.5 to 3 K

7B0B Flow t excess

Excess flow temperature of external heat sources compared to set flow temperature of heating circuit.

A slightly higher flow temperature of the external heat source compensates for possible small mixer leaks.

Note
A negative value reduces the value for ***"Mixer t limit"*** *(7B05).*

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Flow t excess"**

Delivered condition	0 K
Setting	−20 to 20 K

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7B0D Ext. HS for DHW

Using the external heat source for DHW heating.

"Yes" External heat source is enabled for DHW heating.
"No" External heat source is blocked for DHW heating.

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Ext. HS for DHW"**

Delivered condition: No
Setting: Yes/No

7B0E Dual-mode operation

Parallel operation of heat pump and external heat source.

"Yes" Parallel operation of heat pump and external heat source possible.
"No" Heat pump shuts down if the external heat source operates below the **"Dual-mode temperature"** (7B02).

Note
*For the heat pump to be able to be shut down, DHW heating must also be covered by the external heat source. Requirement: Parameter **"Ext. HS for DHW"** (7B0D) is set to **"Yes"**.*

Menu
- **"Device settings"**
- **"Programming"**
- **"Ext. heat source"**
- **"Dual-mode operation"**

Delivered condition: Yes
Setting: Yes/No

5366 335 GB

6000 Set DHW temp.

DHW cylinder set temperature for DHW heating.

If the heat pump alone cannot achieve the set DHW temperature, the instantaneous heating water heater, immersion heater or an external heat source is also started.

Note
*For frost protection, parameter **"Min. temp."** (6005) applies as the set value, and for the auxiliary function, parameter **"Set temp. 2"** (600C) applies as the set value.*

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Set DHW temp."**

Delivered condition	50 °C
Setting	10 to 70 °C

6001 Switching times DHW

Time program for DHW heating.

Time program setting
Operating instructions

Operating modes for DHW heating

"Off"
No DHW heating, only frost protection. Set temperature is **"Min. temp."** (6005).

"Top"
Set temperature is **"Set DHW temp."** (6000). Temperature control with upper cylinder temperature sensor.

"Standard"
Set temperature is **"Set DHW temp."** (6000). Top cylinder temperature sensor provides the start temperature; bottom sensor the stop temperature (if installed).

"Second temperature"
Set temperature is **"Set temp. 2"** (600C). Top cylinder temperature sensor provides the start temperature; bottom sensor the stop temperature (if installed).

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Switching times DHW"**

Delivered condition	Top
Setting	OFF / Top / Standard / Second temperature

5366 335 GB

6004 Operating mode

Mode to select the operating mode for DHW heating.

"Standby"
No operating mode can be set, only frost protection.

"Switching times"
The operating mode is only selected via the programmed switching times, independent of the position of the operating mode selector, the external operating mode changeover and the remote control. For this reason, if the operating mode selector is set to "Standby" or "Manual mode", DHW for example is also heated in accordance with the set switching times.

"Rotary selector"
The operating mode depends on:
- Operating mode selector
- Switching times

"Standard"
The operating mode depends on:
- Operating mode selector
- External operating mode changeover
- Remote control
- Switching times

Note
The priorities for selecting the operating mode correspond to the above order, from top to bottom.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Operating mode"**

Delivered condition	Standard
Setting	Standby / Switching times / Rotary selector / Standard

6005 Min. temperature

Lower set temperature for DHW cylinder (minimum temperature).

5366 335 GB

6005 Min. temperature (cont.)

This set temperature is used as the frost protection limit for the DHW cylinder in "OFF" operating mode. DHW is heated if the temperature falls below the set value, until the temperature in the DHW cylinder has risen back above this limit plus the **"Hysteresis"** (6007).
The temperature for this is always measured at the top cylinder temperature sensor.

Note
Brine/water heat pumps of type BWC use the integral three-way diverter valve "Central/DHW heating" with a stepper motor as a mixer. If the set temperature selected here is above 20 °C, the control unit uses this mixer to transfer excess heat to the DHW cylinder.
*Requirement: Parameters **"Integral 3-way valve"** (7305) and **"Proport. 3-way valve"** (7306) are correctly set.*

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Min. temperature"**

Delivered condition	10 °C
Setting	5 to 60 °C

6006 Max. temp.

Upper temperature limit for DHW cylinders.

When this temperature has been reached, the DHW cylinder is not reheated until the temperature has dropped by at least 5 K.

Danger
Risk of scalding with DHW at **temperatures over 60 ºC**.
To limit the temperature to 60 °C, install a mixing device, e.g. an automatic thermostatic mixing valve (DHW cylinder accessory).

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Max. temperature"**

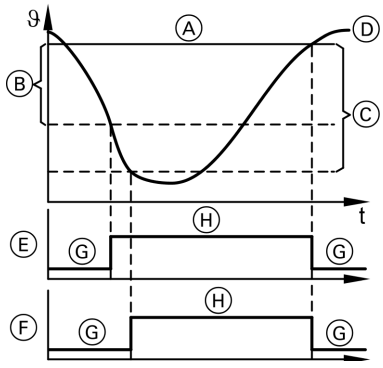
Delivered condition	60 °C
Setting	20 to 80 °C

5366 335 GB

6007 Hysteresis / 6008 Hyst. booster heater

Cylinder temperature hysteresis for starting and stopping DHW heating.

The set value determines the deviation from the set DHW cylinder temperature (**"Set DHW temp."**, 6000) at which DHW heating is started and stopped. Parameter **"Hysteresis"** (6007) relates to DHW heating with the heat pump. Parameter **"Hyst. booster heater"** (6008) specifies the hysteresis during heating by the instantaneous heating water heater (accessory), external heat source or immersion heater (on site, for a DHW cylinder).



Ⓐ Set DHW cylinder temperature
Ⓑ Heat pump hysteresis
Ⓒ Booster heater hysteresis
Ⓓ Actual temperature at the top cylinder temperature sensor
Ⓔ Heat pump control state
Ⓕ Booster heater switching state
Ⓖ Off
Ⓗ On

Note
*The value selected for **"Hysteresis"** should be higher than the expected temperature drop due to heat losses during reduced mode (approx. 5 K). A lower value for **"Hyst. booster heater"** compared to **"Hysteresis"** increases the proportion of auxiliary heating via other heat sources.*

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Hysteresis"** or **"Hyst. booster heater"**

Hysteresis

Delivered condition	7 K
Setting	1 to 10 K

Hyst. Booster heater

Delivered condition	10 K
Setting	2 to 30 K

5366 335 GB

6009 Start optimisation

Comfort function for DHW cylinder heating.

The start optimisation ensures that DHW is already available at the required temperature at the beginning of DHW heating in accordance with the set switching times. For this, DHW heating begins accordingly before the set switching time. The control unit calculates this time point for the start of DHW heating from the differential between the set and actual cylinder temperatures, and parameter **"T rise / hour"** (600D).

"Yes" Start optimisation is on.
"No" Start optimisation is off.

Note
If a second, lower temperature sensor is installed in the DHW cylinder, heating with start optimisation is started and stopped via this sensor.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Start optimisation"**

Delivered condition	No
Setting	Yes/No

600A Stop optimisation

Comfort function for DHW cylinder heating.

The stop optimisation ensures that the DHW cylinder is always fully heated at the end of the start time for DHW heating. Cylinder heating begins accordingly before the set end of DHW heating. The control unit calculates the time point for the start from the differential between the set and actual cylinder temperatures, and parameter **"T rise / hour"** (600D).

"Yes" Stop optimisation is on.
"No" Stop optimisation is off.

Note
If a second, lower temperature sensor is installed in the DHW cylinder, heating with stop optimisation is started and stopped via this sensor.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Stop optimisation"**

Delivered condition	No
Setting	Yes/No

5366 335 GB

600B Auxiliary function

Auxiliary DHW heat-up function to kill bacteria.

At the **first** cylinder heating every Monday, the total cylinder content is heated to the **"Set temp. 2"** (600C). In order that bacteria are also killed in the DHW circulation line, the DHW circulation pump (if installed) runs in addition to the cylinder heating.

"Yes" Auxiliary function is on.
"No" Auxiliary function is off.

Note
*To prevent the cylinder content mixing with the DHW circuit during DHW cylinder heat-up, the control unit does not start the DHW circulation pump until the cylinder temperature has reached the **"Set temp. 2"** up to 50% of its hysteresis (**"Hysteresis"**, 6007).*

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Auxiliary function"**

Delivered condition	No
Setting	Yes/No

600C Set temp. 2

Set temperature for **"Auxiliary function"** DHW and operating mode **"Temperature 2"**.

If a second temperature sensor is installed and enabled, this parameter also specifies the set value for DHW heating only once.

Note
*The maximum adjustable value for **"Set temp. 2"** is the upper temperature limit for the DHW cylinder **"Max. temp."** (6006).*

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Set temp. 2"**

Delivered condition	60 °C
Setting	10 to 70 °C

5366 335 GB

600D T rise / hour

Temperature rise per hour during DHW heating.

This parameter is used for two functions:

- **Starting booster heaters for DHW heating**
  If the temperature rise during DHW heating with the heat pump remains below the specified value, the control unit starts the immersion heater, instantaneous heating water heater or an auxiliary heat source. If the current cylinder temperature has exceeded the set value **"Set DHW temp."** (6000) by **"Hyst. booster heater"**, the booster heaters do not start.

Example:
As a guideline for this setting, it can be assumed that 1 kW of heat pump output raises the temperature of 100 l water by approx. 10 K/h. A heat pump with an output of 6 kW therefore raises the temperature of a reheat volume of 200 l by approx.30 K/h.

- **Start and stop optimisation for DHW heating**
  This parameter specifies the temperature rise for calculating the heat-up time.

If the DHW cylinder has two temperature sensors, the average value is used to calculate the rise.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"T rise / hour"**

Delivered condition	30 K/h
Setting	1 to 1000 K/h

600E Second temperature sensor

Second temperature sensor installed in the DHW cylinder.

If a second cylinder temperature sensor is installed in the lower part of the DHW cylinder, heating is stopped via this sensor in "Standard" and "Second temperature" operating modes. This results in optimised cylinder heating. The start sensor is the top cylinder temperature sensor, except for start and stop optimisation.

"Yes"	Second temperature sensor is installed and enabled.
"No"	Second temperature sensor is not enabled.

The second temperature sensor also provides the temperature signal for stopping DHW heating only once. The set value in this case is the **"Set temp. 2"**.

5366 335 GB

600E Second temperature sensor (cont.)

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Second temperature sensor"**

Delivered condition	No
Setting	Yes/No

600F Excess reaction

Heat drawn off by the DHW cylinder when the heat pump produces an excess of heat or the heat drawn by the secondary circuit is suddenly choked off.

"0" No heat drawn off.

"1" Heat will be drawn off only in case of a critical excess, i.e. if critical temperatures are reached in the heat pump refrigerant circuit, or the minimum runtime has not yet been exceeded.

"2" Heat will be drawn off, even if the excess heat being created is not critical for the heat pump.

Note
If the heat drawn off in case of excess is also intended for other consumers, the load manager inside the control unit ensures efficient distribution.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Excess reaction"**

Delivered condition	2
Setting	0 / 1 / 2

6010 DHW priority

DHW heating priority.

"Yes" The DHW cylinder is heated until it reaches the set DHW temperature, or the period **"Max. runtime"** (6011) has expired. The heat pump only supplies the heating circuit after this.

"No" DHW heating and heating circuit supply are treated equally.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"DHW priority"**

5366 335 GB

6010 DHW priority (cont.)

Delivered condition	Yes	Setting	Yes/No

6011 Max. runtime

Maximum duration of DHW heating with simultaneous heat demand from the heating circuits, if **"DHW priority"** is set to **"Yes"**.

If the heating circuits do not require any heating for the heating circuit, the DHW cylinder is heated independently of the specified duration, until the set cylinder temperature is reached.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Max. runtime"**

Delivered condition	4:00 h
Setting	0:10 to 16:40 h

6012 Max. DHW break

Maximum duration for heating the heating circuits, if **"DHW priority"** is set to **"Yes"**.

If a heat demand from the heating circuits is still present after the specified duration has expired, DHW heating still has priority.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Max. DHW break"**

Delivered condition	1:30 h
Setting	0:10 to 16:40 h

6014 Booster heaters

Enabling DHW reheating by booster heaters.

5366 335 GB

6014 Booster heaters (cont.)

If the set cylinder temperature cannot be reached with the heat pump during DHW heating, either the immersion heater (enabling with **"DHW with e heating"**, 6015), or the external heat exchanger (enabling with **"Ext. HS for DHW"** 7B0D) is started.

"Yes" DHW heating by booster heaters is enabled.

"No" DHW is only heated by the heat pump if it is enabled for this via parameter **"DHW with heat pump"** (5012).

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Booster heater"**

Delivered condition	No
Setting	Yes/No

6015 DHW with e heating

Using electric heaters for DHW reheating.

If the set temperature in the DHW cylinder is not reached through operation of the heat pump alone, the heat pump control unit can enable reheating by an instantaneous heating water heater installed in the secondary circuit flow, or an immersion heater integrated in the DHW cylinder.

"Yes" Instantaneous heating water heater and immersion heater are enabled for DHW reheating. The immersion heater is only used if parameter **"Booster heater"** (6014) is set to **"Yes"**.

"No" Immersion heater and instantaneous heating water heater are blocked for DHW reheating. They continue to be available for heating for frost protection.

Example:
This blocking of immersion heaters for DHW heating is necessary if, for example, the heating system has an external instantaneous water heater on site, which is not controlled via the heat pump control unit.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"DHW with e heating"**

Delivered condition	Yes
Setting	Yes/No

5366 335 GB

7900 Inst.htg.water heat

Instantaneous heating water heater installed.

If an instantaneous heating water heater is installed in the heating water flow, it must be enabled for use.

"Yes" Instantaneous heating water heater installed and enabled.

"No" Instantaneous heating water heater disabled.

! **Please note**
"**No**" stops the instantaneous heating water heater completely, so it is also no longer available for heating for frost protection.
For the instantaneous heating water heater to be able to be restarted in case of a heat demand for frost protection, stop it by setting parameters "**Electric heating**" (7902) or "**DHW with e heating**" (6015) to **"No"**, but set **"Inst.htg. water heat"** to **"Yes"**.

Menu
- **"Device settings"**
- **"Programming"**
- **"Electric heating"**
- **"Inst.htg.water heat"**

Delivered condition	No
Setting	Yes/No

7902 Electric heating

Enabling the instantaneous heating water heater for heating mode.

If an instantaneous heating water heater is installed and enabled in the heating water flow, it can be enabled or blocked for heating mode.

"Yes" Instantaneous heating water heater is enabled for heating mode.

"No" Instantaneous heating water heater is blocked for heating mode.

7902 Electric heating (cont.)

Note
Even if the instantaneous heating water heater is blocked for heating mode, it is started by the control unit for frost protection of the heating system.
The instantaneous heating water heater can also be enabled for DHW heating; see parameter ***"DHW with e heating"*** *(6015).*

Menu
- **"Device settings"**
- **"Programming"**
- **"Electric heating"**
- **"Electric heating"**

Delivered condition	Yes
Setting	Yes/No

7904 Max. flow temp

Maximum flow temperature of the instantaneous heating water heater.

This parameter describes a component property of the instantaneous heating water heater. The heat pump control unit stops the instantaneous water heater as soon as this value is reached. To stop the high limit safety cut-out (STB) being initiated, the maximum flow temperature must be lower than the STB temperature.

Note
Never *use this parameter to limit the system flow temperature (exception: External control, system diagram 11). This value must therefore always be higher than the maximum temperature of the consumers (exception: DHW cylinder with solar collectors).*

Menu
- **"Device settings"**
- **"Programming"**
- **"Electric heating"**
- **"Max. flow temp"**

Delivered condition	65 °C
Setting	5 to 75 °C

7905 Heater rod delay

Start delay for the instantaneous heating water heater.

7905 Heater rod delay (cont.)

Within the given period, the instantaneous heating water heater does not start after a change from "Standard"/ "Reduced" operating mode, or after a changeover from DHW/central heating. During this period, the control unit does **not** calculate the integral of duration and level of deviation from the set to actual temperature, which is crucial for a start-up.

Note
The control unit only starts the electric booster heaters within the specified delay if there is a very high heat demand, e.g. demand to safeguard frost protection.

Menu
- **"Device settings"**
- **"Programming"**
- **"Electric heating"**
- **"Heater rod delay"**

Delivered condition	30 min
Setting	0 to 300 min

7907 Max. stage E heating

Maximum output stage of the immersion heater and instantaneous heating water heater.

This setting determines the maximum output (stage 1, 2 or 3) of the electric heaters, with which DHW or system heating is carried out.
In some cases, the output stages available depend on the type of power connection.

"1" Output stage 1, e.g. 3 kW
"2" Output stage 2, e.g. 6 kW
"3" Output stage 3, or subject to type and power connection, stage 1 and 2 simultaneously, e.g. 9 kW

Menu
- **"Device settings"**
- **"Programming"**
- **"Electric heating"**
- **"Max. stage E heat"**

Delivered condition	3
Setting	1 / 2 / 3

7908 Blocking time, power failure

Blocking time of the instantaneous heating water heater after restarting the heat pump.

7908 Blocking time, power failure (cont.)

This time prevents the instantaneous heating water heater starting prematurely, after the heat pump has been shut down for a prolonged period. This applies both after a manual shut-down and in case of a power shut-off or power failure.

Menu
- **"Device settings"**
- **"Programming"**
- **"Electric heating"**
- **"Blocking time, power failure"**

Delivered condition	0:00 h
Setting	0:00 to 18:00 h

7909 Stage power failure

Output stage of instantaneous heating water heater after power failure.

To be able to more quickly cover the large energy demand after a prolonged power failure, a higher output stage of the instantaneous heating water heater can be started right from the beginning with the specified value.

"0" Instantaneous heating water heater remains off after a power failure, except for frost protection.
"1" Output stage 1, e.g. 3 kW
"2" Output stage 2, e.g. 6 kW
"3" Output stage 3, or subject to type and power connection, stage 1 and 2 simultaneously, e.g. 9 kW

Note
*The instantaneous heating water heater does not restart until the blocking time **"Blocking time, power failure"** (7908) has expired.*

Menu
- **"Device settings"**
- **"Programming"**
- **"Electric heating"**
- **"Stage power failure"**

Delivered condition	0
Setting	0 / 1 / 2 / 3

790A Stage at power-OFF

Maximum output stage of the instantaneous heating water heater during the power-OFF.

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790A Stage at power-OFF (cont.)

The selected stage and all those below it will be enabled.

"0" Instantaneous heating water heater remains off during power-OFF, except for frost protection.
"1" Output stage 1, e.g. 3 kW
"2" Output stage 2, e.g. 6 kW
"3" Output stage 3, or subject to type and power connection, stage 1 and 2 simultaneously, e.g. 9 kW

Menu
- **"Device settings"**
- **"Programming"**
- **"Electric heating"**
- **"Stage at power-OFF"**

Delivered condition	0
Setting	0 / 1 / 2 / 3

7300 HP for dry. buildings

Using the heat pump for drying buildings.

Heat pumps are not designed for a very high energy demand, e.g. for drying buildings. Furthermore, the heat pump primary circuit is often not yet completed at this time. Therefore an instantaneous heating water heater, temporarily installed especially for the purpose, often takes over the hot water heating while a building is being dried.

Note
Drying buildings with an instantaneous heating water heater results in high power consumption.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"HP for drying buildings"**

"Yes"	Heat pump is used for drying a building.
"No"	Heat pump is not used for drying a building.

Delivered condition	No
Setting	Yes/No

7303 Screed program

Temperature/time profile for screed drying.

For screed drying with underfloor heating, there are 12 different programs stored in the control unit, which are partially based on the specifications of various standards.
The program has the following properties:
- Screed drying affects all enabled heating circuits.
- The flow temperature is always limited to the value **"Max. flow temp"** (200E), even if the subsequent temperature/time profiles are shown with a higher flow temperature.
- In the fixed value temperature programs 7 to 12, the temperature is regulated to the maximum flow temperature (**"Max. flow temp"**, 200E) (delivered condition: 40 °C).
- The function continues automatically after a power failure or after the control unit has been switched off.

Please note
Avoid high flow temperatures. There is a risk that the screed will overheat.
Use a temperature limiter as a maximum limit for underfloor heating systems

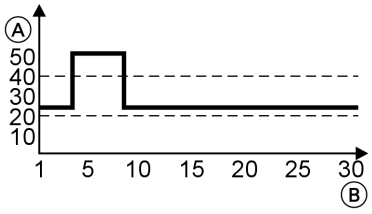
7303 Screed program (cont.)

"0"

No temperature/time profile
Termination of the current profile and operation continued in heating or cooling mode.

"1"

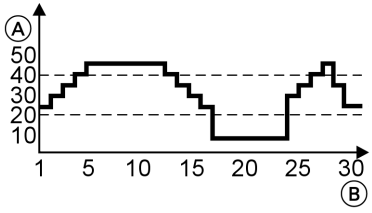
Temperature/time profile 1 (in acc. with EN 1264-4)



Ⓐ Flow temperature
Ⓑ Days

"2"

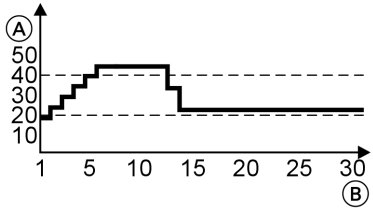
Temperature/time profile 2 (to ZV parquet and flooring technology)



Ⓐ Flow temperature
Ⓑ Days

"3"

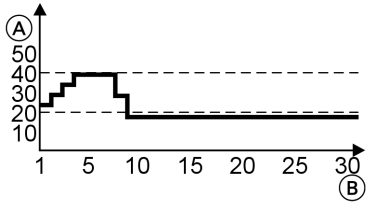
Temperature/time profile 3 (to ÖNORM)



Ⓐ Flow temperature
Ⓑ Days

"4"

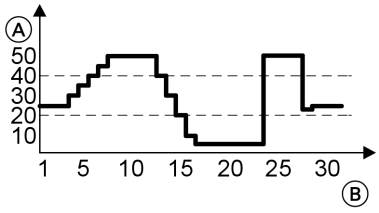
Temperature/time profile 4



Ⓐ Flow temperature
Ⓑ Days

"5"

Temperature/time profile 5

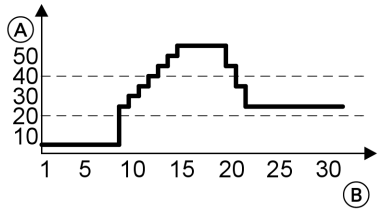


Ⓐ Flow temperature
Ⓑ Days

7303 Screed program (cont.)

"6"

Temperature/time profile 6



Ⓐ Flow temperature
Ⓑ Days

"7"

Fixed value temperature program
Duration: 5 days

"8"

Fixed value temperature program
Duration: 10 days

"9"

Fixed value temperature program
Duration: 15 days

"10"

Fixed value temperature program
Duration: 20 days

"11"

Fixed value temperature program
Duration: 25 days

"12"

Fixed value temperature program
Duration: 30 days

Note

For screed drying, observe the specifications of EN 1264-4 for underfloor heating systems.
Screed drying with an instantaneous heating water heater results in high power consumption.

The report for screed drying to be provided by the heating contractor must contain the following details:

- Heat-up data with respective flow temperatures
- Max. flow temperature achieved
- Operating condition and outside temperature during handover

Menu

- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Screed program"**

Delivered condition	0
Setting	0 to 12

7304 Hysteresis secondary

Hysteresis secondary circuit temperature for starting and stopping the heat sources.

5366 335 GB

7304 Hysteresis secondary (cont.)

The secondary circuit set temperature results accordingly from the current heat demands. The hysteresis of the secondary circuit temperature specifies the deviation from the set return temperature at which one of the available heat sources (heat pump, external heat source, instantaneous heating water heater) starts or stops. Heating circuits connected to the heating water buffer cylinder are regulated to the flow temperature; direct heating circuits without a heating water buffer cylinder are regulated to the return temperature, taking a fixed spread of 5 K into account.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Hyst. secondary"**

Delivered condition	2 K
Setting	0.5 to 5 K

7305 Integral 3-way valve

Integral proportion of the mixer control circuit "Central heating/DHW" (three-way diverter valve).

A high value results in a rapid response.

Note
Brine/water heat pumps of type BWC use the integral three-way diverter valve with a stepper motor as a mixer. For this, the values of parameter ***"Integral 3-way valve"*** *(7305) or* ***"Proport. 3-way valve"*** *(7306) must be greater than 0.*

If the heating circuit return temperature exceeds the maximum permissible value, part of the heat is transferred to the DHW cylinder. This means the compressor can remain on longer. This function is not required for systems with a heating water buffer cylinder, since the cylinder can absorb the heat in this case.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Integral 3-way valve"**

Delivered condition	0
Setting	0 to 50

5366 335 GB

7306 Prop. 3-way valve

Proportion of the mixer control circuit "Central heating/DHW" (three-way diverter valve).

Note
Brine/water heat pumps of type BWC use the integral three-way diverter valve with a stepper motor as a mixer. For this, the values of parameter ***"Integral 3-way valve"*** *(7305) or* ***"Proport. 3-way valve"*** *(7306) must be greater than 0.*

If the heating circuit return temperature exceeds the maximum permissible value, part of the heat is transferred to the DHW cylinder. This means the compressor can remain on longer. This function is not required for systems with a heating water buffer cylinder, since the cylinder can absorb the heat in this case.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Proport. 3-way valve"**

Delivered condition	0
Setting	0 to 100

7307 Max. step 3-way v

Number of stepper motor pulses for the integral three-way diverter valve between the start and end positions.

Note
Brine/water heat pumps of type BWC have three-way diverter valves with a stepper motor.
The number of pulses depends on the type of valve used, and is already correctly set in the delivered condition. Checking and matching is only required after replacing the three-way diverter valve with a different type.
To enable the modified settings, first switch the heat pump OFF and then ON again once at the system ON/OFF switch.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Max. step 3-way v"**

Delivered condition	1100
Setting	−30000 up to 30000

5366 335 GB

7308 Heat p night op

Operating mode of air/water heat pumps during the night.

Alongside output regulated mode, a quieter mode with constant, reduced fan speed is available for air/water heat pumps (type AW).

"Yes" Output regulated mode between 22:00 h and 06:00 h.

"No" Quieter mode between 22:00 h and 06:00 h.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Heat p night op"**

Delivered condition	Yes
Setting	Yes/No

7309 Heat pump run-on

Compressor run-on time after DHW/central heating changeover.

Directly after changeover to central heating, the value measured at the return temperature sensor does not correspond to the heating circuit return temperature for a few seconds, because of flow characteristics. To be able to react immediately to a potential heat demand from the heating circuits, the compressor remains on around the adjustable run-on time with this parameter. It only shuts down when the run-on time has expired without a heat demand.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Heat pump run-on"**

Delivered condition	2:00 min
Setting	0:00 to 10:00 min

730B Sec pump run-on

Secondary pump run-on time after heat generation has ended.

730B Sec pump run-on (cont.)

After heat generation has ended, particularly for DHW heating, heat is still available at the condenser. During the run-on time, the secondary pump feeds this heat to the heating system. This means at the next start, the compressor will have to start against a lower temperature level.

Note
The secondary pump run-on time begins after the compressor or also other heat sources have been shut down.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Sec pump run-on"**

Delivered condition	2:00 min
Setting	0:10 to 5:00 min

730C Set flow ex. demand

Set flow temperature in case of external demand, e.g. from the swimming pool.

At this connection, in contrast to room temperature or outside temperature-dependent set flow temperatures, e.g. for the heating circuits, a fixed set flow temperature is selected.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Set flow ex. demand"**

Delivered condition	50 °C
Setting	0 to 70°C

730D Heat/DHW diverter v

Three-way diverter valve installed.

Subject to system diagram, this valve is used to switch between DHW heating and central heating.

"Yes" Valve is installed; secondary pump also runs for DHW heating.

"No" Valve is not installed; DHW is heated via a separate output; secondary pump does not run; circulation pump for cylinder heating is started.

730D Heat/DHW diverter v (cont.)

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"Heat/DHW diverter v"**

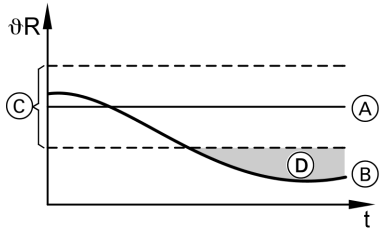
Delivered condition

-Vitocal 300-G	No
-Vitocal 300-A, type AW-O	No
-Vitocal 300-A, type AWC-I	Yes
Setting	Yes/No

730E E heating threshold

Start criteria for instantaneous heating water heater.

To prevent the instantaneous heating water heater starting immediately if the set temperature is not reached for a short time, the control unit uses the integral of duration and level of deviation from the set to actual temperature as start criteria. The specified value is the grey area between the actual temperature curve with the hysteresis of the secondary flow temperature, and therefore has the unit K·min.



Ⓐ Set control temperature
Ⓑ Actual temperature
Ⓒ Secondary flow temperature hysteresis
Ⓓ **"E heating threshold"**

Note
This parameter serves not only as the start criteria for the instantaneous heating water heater, but also for compressor stage 2. The load manager inside the control unit decides which heat sources to start, from economical and ecological viewpoints.

Menu
- **"Device settings"**
- **"Programming"**
- **"Internal hydraulics"**
- **"E heating threshold"**

Delivered condition	300 K·min
Setting	10 to 30000 K·min

5366 335 GB

7200 Buffer cylinder

Heating water buffer cylinder or low loss header are installed.

If a heating water buffer cylinder is installed as an option with system diagrams 1 and 2, the buffer is enabled for use with this parameter. For the other system diagrams, the heating water buffer cylinder is already a system component, and does not need to be specially added.

Menu
- **"Device settings"**
- **"Programming"**
- **"Buffer cylinder"**
- **"Buffer cylinder"**

Delivered condition	No
Setting	Yes/No

System examples - heat pumps

7201 Switch t buffer cyl.

Time program for the heating water buffer cylinder.

Time program setting
Operating instructions

Operating modes for heating water buffer cylinder

"Off"
Heating water buffer cylinder is not heated up; only heating for frost protection if heating water temperature drops below 3 °C. The end of frost protection heating is at 10 °C.

"Reduced"
The set cylinder temperature is the maximum value of all heating circuit set temperatures. Stopping heating is controlled either by the buffer cylinder temperature sensor or return temperature sensor, depending which reaches the stop limit **"Max. temp."** (7204) first.

"Standard"
The set cylinder temperature is the maximum value of all heating circuit set temperatures. Heating is stopped if the stop limit **"Max. temp."** (7204) is reached at the buffer cylinder temperature sensor.

"Fixed value"
The set cylinder temperature is **"Fixed temp."** (7202). Heating is stopped if the stop limit **"Max. temp."** (7204) is reached at the return temperature sensor. This operating mode serves e.g. to heat the heating water buffer cylinder at lower cost with night tariff power.

Menu
- **"Device settings"**
- **"Programming"**

7201 Switch t buffer cyl. (cont.)

■ **"Buffer cylinder"**
■ **"Switch t buffer cyl."**

Delivered condition Standard

Setting OFF / Reduced / Standard / Fixed value

7202 Fixed temp.

Set temperature for "Fixed value" operating mode of the heating water buffer cylinder.

Note
*The maximum value for **"Fixed temp."** is the upper temperature limit for the heating water buffer cylinder **"Max. temp."** (7204).*

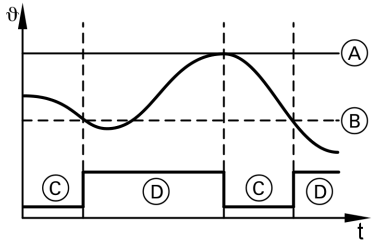
Menu
■ **"Device settings"**
■ **"Programming"**
■ **"Buffer cylinder"**
■ **"Fixed temperature"**

Delivered condition 50 °C
Setting 10 to 70 °C

7203 Hysteresis

Cylinder temperature hysteresis for heating the heating water buffer cylinder.

The set value determines the deviation from the set temperature of the heating water buffer cylinder (subject to operating mode) at which heating is started and stopped.



Ⓐ Set temperature
Ⓑ Start hysteresis
Ⓒ Heating the heating water buffer cylinder OFF
Ⓓ Heating the heating water buffer cylinder ON

5366 335 GB

7203 Hysteresis (cont.)

Note
*When using a low loss header, enter a higher value than for hysteresis of the secondary circuit (**"Hysteresis secondary"**, 7304).*

Menu
- **"Device settings"**
- **"Programming"**
- **"Buffer cylinder"**
- **"Hysteresis"**

Delivered condition	5 K
Setting	2 to 20 K

7204 Max. temp.

Upper temperature limit for heating water buffer cylinder.

Heating of the heating water buffer cylinder ends when this temperature is reached.

Note
If the value specified here is below the maximum possible set flow temperature of one of the connected heating circuits, this circuit may not be able to be supplied with the calculated flow temperature in case of a larger heat demand.

Menu
- **"Device settings"**
- **"Programming"**
- **"DHW"**
- **"Max. temperature"**

Delivered condition	60 °C
Setting	1 to 70 °C

7205 Stop optimisation

Stop optimisation for heating water buffer cylinder.

"Yes"	Function enabled; heating water buffer cylinder is always fully heated for selected switching times at the end of "Standard" operating mode.
"No"	No stop optimisation for the heating water buffer cylinder.

Note
*Stop optimisation is only available for system diagrams 1 and 2 if parameter **"Buffer cylinder"** is set to **"Yes"**.*

Menu
- **"Device settings"**
- **"Programming"**

7205 Stop optimisation (cont.)

- **"Buffer cylinder"**
- **"Stop optimisation"**

Delivered condition No
Setting Yes/No

7206 Excess reaction

Heat drawn off by the heating water buffer cylinder when the heat pump produces an excess of heat or the heat drawn by the secondary circuit is suddenly choked off.

"0" No heat drawn off.
"1" Heat will be drawn off only in case of a critical excess, i.e. if critical temperatures are reached in the heat pump refrigerant circuit, or the minimum heat pump runtime has not yet been exceeded.
"2" Heat will be drawn off, even if the excess heat being created is not critical for the heat pump.

Note
If the heat drawn off in case of excess is also intended for other consumers, the load manager inside the control unit ensures efficient distribution.

Menu
- **"Device settings"**
- **"Programming"**
- **"Buffer cylinder"**
- **"Excess reaction"**

Delivered condition 2
Setting 0 / 1 / 2

5366 335 GB

Heating circuit control settings

The control settings for the heating circuits are explained below.

Parameters with numbers 2xxx always relate to the first heating circuit (A1), whereas numbers 3xxx and 4xxx describe the identical parameters of the second (M2) and third (M3) heating circuits.

A1	Direct heating circuit	2xxx
M2	Mixer circuit 1 with directly controlled mixer motor (230 V)	3xxx
M3	Mixer circuit 2 with KM BUS mixer	4xxx

Note
Parameters 3xxx and 4xxx are only available if the associated heating circuits are components of the system diagram.

2000 Room t standard / 2001 Room t reduced

Presetting the set room temperature of the heating circuit for "Standard" and "Reduced" operating modes.

The centre position of rotary selector ☼ (Reduced: ☽) specifies the temperature preset here at the control unit. This value applies to all circuits without remote control.
With rotary selector ☼ (Reduced: ☽), the temperatures can be matched in steps of 1 °C by ±5 °C, without changing the values set here.

Note
With the set room temperature selected at rotary selector ☼ (Reduced: ☽), the control unit calculates the set flow temperature in weather-compensated mode for the heating circuit in accordance with the set heating curve. The set flow temperature for room temperature-dependent control is calculated from the differential of the set and actual room temperature.
The maximum value for ***"Room t reduced"*** *is* ***"Room t standard"*** *-1 K.*

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Room t standard"** or **"Room t reduced"**

5366 335 GB

2000 Room t standard / 2001 Room t reduced (cont.)

Room t standard		**Room t reduced**	
Delivered condition	20 °C	Delivered condition	16 °C
Setting	10 to 30 °C	Setting	10 to 30 °C

2002 Switching times HC

Time program for the heating circuits.

Time program setting
Operating instructions

Operating modes for heating circuits

"Standby"
Frost protection and heating are carried out when one of the following conditions is met:
- Outside temperature falls below **"Frost protection t"** (7006)
- Room temperature falls below 5 °C
- Flow temperature is lower than 5 °C

Additionally, all directly controlled pumps are started daily at 13:00 h for 10 s.

"Reduced"
Central heating with reduced room temperature. The reduced room temperature can be set with parameter **"Room t reduced"** (2001) and at rotary selector ☽.

"Standard"
Central heating with standard room temperature. The standard room temperature can be set with parameter **"Room t standard"** (2000) and at rotary selector ☼.

"Fixed value"
Heating with **"Max. flow temp."** (200E).

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Switching times HC"**

Delivered condition	Standard
Setting	Standby / Reduced / Standard / Fixed value

5366 335 GB

2003 Remote control

Remote control installed.

A separate Vitotrol 200 remote control unit can be used for each heating circuit.


Vitotrol 200 installation instructions

"Yes" Vitotrol 200 remote control for a heating circuit with room temperature sensor is installed and enabled.

"No" Remote control is not enabled.

Note
Remote control units have no function when the heat pump is in manual mode "✋".

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Remote control"**

Delivered condition	No
Setting	Yes/No

2004 Operating mode

Mode to select the operating mode for the heating circuits.

"Standby"
No operating mode can be set, only frost protection.

"Reduced" *1
The heating circuit is permanently heated in "Reduced" operating mode (room temp.-dependent or weather-compensated), independent of the position of the operating mode selector, external operating mode changeover and remote control.

"Standard"*1
The heating circuit is permanently heated in "Standard" operating mode (room temp.-dependent or weather-compensated), independent of the position of the operating mode selector, external operating mode changeover and remote control.

"Fixed value"
The heating circuit is permanently heated to **"Max. flow temp."** (200E), independent of the position of the operating mode selector, the external operating mode changeover and the remote control.*1

*1 *This operating mode is also enabled if the operating mode selector is set to "Standby" or "Manual mode".*

2004 Operating mode (cont.)

"Switching times"
The operating mode is only selected via the programmed switching times, independent of the position of the operating mode selector, the external operating mode changeover and the remote control.*1

"Rotary selector"
The operating mode depends on:
- Operating mode selector
- Switching times

"Standard"
The operating mode depends on:
- Operating mode selector
- External operating mode changeover
- Remote control
- Switching times

Note
The priorities for selecting the operating mode correspond to the above order, from top to bottom.

Note
*If all functions of the programming unit are to be used, select the **"Standard"** setting for this parameter.*

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Operating mode"**

Delivered condition	Standard
Setting	Standby / Reduced / Standard / Fixed value / Switching times / Rotary selector / Standard

2005 Room control

Room temperature-dependent control of the heating circuit.

Requirement: Room temperature sensor is connected and enabled (parameter **"Remote control"**, 2003 set to **"Yes"**).

*1 *This operating mode is also enabled if the operating mode selector is set to "Standby" or "Manual mode".*

2005 Room control (cont.)

"Yes" Room temperature-dependent control enabled. In contrast to weather-compensated control, the control unit does not use the level and slope of the heating curve to calculate the set flow temperature, but rather the integral of duration and level of deviation from the set to actual temperature. Level and slope of the heating curve cannot be adjusted in the control unit for this heating circuit.

"No" Weather-compensated control enabled. The control unit uses the current level and slope of the heating curve to calculate the set flow temperature.

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Room temperature control"**

Delivered condition	No
Setting	Yes/No

2006 Heating curve level / 2007 Heating curve slope

Heating curve level and slope for the specified heating circuit.

If the room temperature does not meet the set value for a prolonged period, the heating characteristics can be matched to the individual ambient conditions. This is done by changing the slope and level of the heating curve.

Setting the heating curve
Operating instructions

Observe the modified heating characteristics over several days (if possible, await a significant change in the weather) before making further adjustments. Rotary selectors ☼ and ☽ are available for short-term changes to the room temperature.

Note
*These two parameters are not available for room temperature-dependent control (parameter **"Room control"**, 2005).*

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Heating curve level"** or **"Heat. curve slope"**

Heating curve level

Delivered condition	0 °C
Setting	-15 to 40 °C

Heating curve slope

Delivered condition	0.6
Setting	0 to 3.5

5366 335 GB

2009 Integral room thermostat

Integral proportion of the control circuit for room temperature-dependent heating mode.

A high value results in a rapid response. Requirement: **"Room control"** (parameter 2005) is set to **"Yes"**.

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Integral room temperature controller"**

Delivered condition	100
Setting	5 to 1000

200A Room t hook-up slope

Level of the room influence (room temperature hook-up slope).

This value specifies the influence of room temperature hook-up on the set flow temperature of the relevant heating circuit with weather-compensated control. A high value results in a large influence.
Requirement: Room temperature sensor is installed and enabled (parameter **"Remote control"**, 2003 set to **"Yes"**), and room influence via parameter **"Room t hook-up"** (200B) is enabled.

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Room t hook-up slope"**

Delivered condition	10
Setting	0 to 50

200B Room t hook-up

Operating mode for room influence (room hook-up).

This parameter determines the conditions under which the set flow temperature with weather-compensated control should be corrected by the room influence.

"0" Weather-compensated control without room influence. Set flow temperature is not corrected.

200B Room t hook-up (cont.)

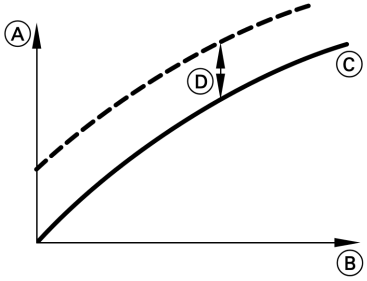
"1" Weather-compensated control with room influence only for "Standard" operating mode.
"2" Weather-compensated control with room influence only for "Reduced" operating mode.
"3" Weather-compensated control with room influence for "Reduced" and "Standard" operating mode.

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Room t hook-up"**

Delivered condition	3
Setting	0 / 1 / 2 / 3

200D Max. flow corr.

Maximum permissible correction of the set flow temperature of a heating circuit via room temperature hook-up.



Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Max. flow corr."**

Delivered condition	10 K
Setting	0.1 to 10 K

Ⓐ Flow temperature heating circuit
Ⓑ Time
Ⓒ Set flow temperature curve
Ⓓ Possible positive correction range

200E Max. flow temp.

Maximum permissible set flow temperature for a heating circuit.

5366 335 GB

200E Max. flow temp. (cont.)

If a higher value than given here results due to outside temperature and heating curve, the control unit selects the value specified here as the maximum. For a direct heating circuit, limited modulation properties mean the heat pump does not regulate to the flow temperature, but rather to the return temperature. The set return temperature for this is calculated from the set flow temperature minus a fixed spread of 5 K.

Note
Since the heat pump control unit only limits the set value with this parameter, always protect underfloor heating circuits additionally with an on-site thermostat (floor thermostat).

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Max. flow temp"**

Delivered condition	40 °C
Setting	10 to 70 °C

2010 DHW for party

DHW heating durung party mode.

"Yes" After enabling party mode, the heat pump and/or auxiliary heat sources first fully heat up the DHW cylinder once. Central heating is only provided after this.

"No" Control unit switches to central heating immediately.

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"DHW during party"**

Delivered condition	Yes
Setting	Yes/No

2011 Excess reaction

Heat drawn off by the heating circuit when the heat pump produces an excess of heat or the heat drawn by the secondary circuit is suddenly choked off.

5366 335 GB

2011 Excess reaction (cont.)

"0" No heat drawn off.
"1" Heat will be drawn off only in case of a critical excess, i.e. if critical temperatures are reached in the heat pump refrigerant circuit, or the minimum runtime has not yet been exceeded.
"2" Heat will be drawn off, even if the excess heat being created is not critical for the heat pump.

Note
If the heat drawn off in case of excess is also intended for other consumers, the load manager inside the control unit ensures efficient distribution.

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Excess reaction"**

Delivered condition	2
Setting	0 / 1 / 2

2012 Room t excess

Maximum excess room temperature compared to the set room temperature.

If the actual room temperature exceeds the set value by the specified value, the control unit stops all heat sources used for central heating. Along with the heat pump, these include the instantaneous heating water heater or an external heat source. Requirement: Room temperature sensor is installed and enabled (parameter **"Remote control"**, 2003 set to **"Yes"**).

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Room t excess"**

Delivered condition	5 K
Setting	0.5 to 20 K

2014 Flow t excess

Increase in the set flow temperature in the secondary circuit compared to the mixer circuits.

5366 335 GB

2014 Flow t excess (cont.)

The set flow temperature in the secondary circuit corresponds to the highest set flow temperature in one of the heating circuits. To compensate for heat losses at the mixers, the control unit selects a flow temperature for the secondary circuit which is higher by the specified value.

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Flow t excess"**

Delivered condition	0 K
Setting	−10 to 40 K

2015 Mixer runtime

Time required by the mixer to completely switch between two operating states (angle range 90°).

This value is a property of the mixer motor and can be found in the associated specification. If the specified time for the mixer used is too short, this can lead to the mixer "oscillating".

Note
This parameter only affects mixers with direct motor control, not KM BUS mixers.

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Mixer runtime"**

Delivered condition	2:05 min
Setting	0:05 to 4:15 min

2018 Mixer active zone / 2019 Mixer dead zone

Heating circuit mixer active zone/dead zone.

The dead zone (switching point interval) determines the fluctuation range around the set flow temperature, in which the mixer does not respond (is at zero volt). Outside the dead zone, the mixer adjusts its set position subject to the temperature differential.

The active zone specifies the sensitivity of the mixer control from the temperature deviation. A high value results in a rapid response.

Note
These parameters only affect mixers with direct motor control, not KM BUS mixers.

5366 335 GB

2018 Mixer active zone 🔒 / 2019 Mixer dead zone . . . (cont.)

Menu
- **"Device settings"**
- **"Programming"**
- **"Heating circuits"**
- **"Mixer active zone"** or **"Mixer dead zone"**

Active zone

Delivered condition	4 K
Setting	2 to 40 K

Dead zone

Delivered condition	1 K
Setting	0.5 to 3 K

5366 335 GB

7100 Cooling

Type of cooling mode.

"0" No cooling.
"1" "Natural cooling"
Direct cooling of a heating or cooling circuit using the NC-Box without mixer.
"2" Natural cooling on a heating or cooling circuit using the NC-Box with mixer.
"3" Active cooling using the AC-Box. Since the compressor runs for active cooling, this function must be enabled once before starting by the system user in a separate step.

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Cooling"**

Delivered condition 0
Setting 0 / 1 / 2 / 3

7101 Cooling circuit

Determining the circuit for cooling mode.

This parameter specifies whether cooling should occur in one of the heating circuits or in a separate cooling circuit.

Note
Cooling mode is not possible for several heating or cooling circuits simultaneously.

"1" Cooling heating circuit 1
"2" Cooling heating circuit 2
"3" Cooling heating circuit 3
"4" Cooling a separate cooling circuit

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Cooling circuit"**

Delivered condition 1
Setting 1 / 2 / 3 / 4

5366 335 GB

7102 Room temperature

Set room temperature for the separate cooling circuit.

Requirement: Room temperature sensor is enabled (parameter **"Remote control"**, 2003 set to **"Yes"**), parameter **"Room control"** (7105) is set to **"Yes"**, and the value **"4"** is set for **"Cooling circuit"** (7101).
With this parameter a different set room temperature then for the heating circuits can be specified for the separate cooling circuit. This makes it possible, for example, to also cool a storage room in winter, independent of the set room temperature.

Note
*For cooling a heating circuit, the control unit uses the set room temperature that results from the value of parameter **"Room t standard"** (2000) and the position of rotary selector ✹.*

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Room temperature"**

Delivered condition	20 °C
Setting	10 to 30 °C

7103 Min. flow temp.

Minimum permissible set flow temperature for cooling mode.

If a lower set temperature than the value specified here results due to outside and room temperature according to the cooling curve, the flow temperature is regulated to this value.

Note
Only the set flow temperature is limited with this value, not the actual temperature.
The minimum permissible set flow temperature specified here applies both for cooling a heating circuit as well as for cooling a separate cooling circuit.

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Min. flow temp."**

Delivered condition	10 °C
Setting	1 to 30 °C

5366 335 GB

7104 Room t hook-up slope

Level of the room influence (room temperature hook-up slope).

This value specifies the influence of room temperature hook-up on the set flow temperature with weather-compensated cooling mode. A high value results in a large influence. The value 0 stops room influence.
Requirement: Room temperature sensor is installed and enabled (parameter **"Remote control"**, 2003 set to **"Yes"**), and specified value is greater than 0.

Note
Room influence has an effect both for cooling mode on one heating circuit and for a separate cooling circuit.

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Room t hook-up slope"**

Delivered condition	0
Setting	0 to 50

7105 Room control

Room temperature-dependent control for cooling mode.

Requirement: Room temperature sensor is installed and enabled (parameter **"Remote control"**, 2003 set to **"Yes"**).

"Yes" Room temperature-dependent control enabled. In contrast to weather-compensated control, the control unit does not use the level and slope of the cooling curve to calculate the set flow temperature, but rather the integral of duration and level of deviation from the set to actual temperature. Level and slope of the cooling curve cannot be adjusted in the control unit.

"No" Weather-compensated control enabled. The control unit uses the current level and slope of the cooling curve to calculate the set flow temperature.

Note
Room temperature-dependent control is possible both for cooling a heating circuit and for cooling a separate cooling circuit.

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Room temperature control"**

Delivered condition	Yes
Setting	Yes/No

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7106 Ranking RTS

Switching the room temperature sensor for cooling mode to a separate cooling circuit.

This value determines which room temperature sensor is used for room temperature-dependent control of the separate cooling circuit.

"0" Using the cooling circuit room temperature sensor
"1" Using room temperature sensor - heating circuit 1
"2" Using room temperature sensor - heating circuit 2
"3" Using room temperature sensor - heating circuit 3

Example:

If the heating circuit and separate cooling circuit affect the same room, using the heating circuit room temperature sensor for cooling mode as well means one less room temperature sensor is required.

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Ranking RTS"**

Delivered condition	0
Setting	0 / 1 / 2 / 3

7107 Room t hyster.cool

Room temperature hysteresis for starting and stopping cooling mode.

If the room temperature deviates by more than the specified value, the cooling function starts or stops.

Note
This parameter has an effect both on cooling a heating circuit and for cooling a separate cooling circuit.

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Room t hyster.cool"**

Delivered condition	1 K
Setting	0.5 to 10 K

7108 Integral room thermostat

Integral proportion of the control circuit for room temperature-dependent cooling mode.

7108 Integral room thermostat (cont.)

A high value results in a rapid response. Requirement: **"Room control"** (parameter 7105) is set to **"Yes"**.

Note
This parameter has an effect both on cooling a heating circuit and for cooling a separate cooling circuit.

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Integral room temperature controller"**

Delivered condition	100
Setting	5 to 1000

7110 Cooling curve level / 7111 Cooling curve slope

Cooling curve level and slope for weather-compensated cooling mode.

If the room temperature does not meet the set value for a prolonged period, the cooling characteristics can be matched to the individual ambient conditions. This is done by changing the slope and level of the cooling curve.

Installation and service instructions

Observe the modified cooling characteristics over several days (if possible, await a significant change in the weather) before making further adjustments. Rotary selector ☼ is available for short-term changes to the room temperature.

Note
*These two parameters are not available for room temperature-dependent control (parameter **"Room control"**, 7105).*

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"Cooling curve level"** or **"Cooling curve slope"**

Cooling curve level

Delivered condition	0 °C
Setting	-15 to 40 °C

Cooling curve slope

Delivered condition	1.2
Setting	0 to 3.5

5366 335 GB

7115 NC mixer type

Control of the NC-Box mixer motor.

"0" Via KM BUS.
"1" Directly via heat pump control unit.
"2" No NC mixer control; heating circuit mixer is used to set the temperature for natural cooling.

Note
*For setting value **"2"**, the hydraulic system diagram must be designed so that cooling mode is possible via the heating circuit mixer. In addition, the mixer used must be suitable for cooling operation. Therefore never use a mixer with steel casing.*

Menu
- **"Device settings"**
- **"Programming"**
- **"Cooling"**
- **"NC mixer type"**

Delivered condition	0
Setting	0 / 1 / 2

5366 335 GB

7710 LON module installed

LON communication module is installed in the heat pump control unit.

"Yes" LON communication module is installed and enabled.

"No" LON communication module is not enabled.

Menu
- **"Communication"**
- **"LON module installed"**

Delivered condition: No
Setting: Yes/No

Menu
- **"Device settings"**
- **"Programming"**

7777 Subscriber number / 7798 System number

Range of numbers in LON addresses.

The addresses of LON subscribers consist of three different parts, as in a telephone network (country code, area code, subscriber number). The first part is permanently set to the same value for all Viessmann appliances. The other parts comprise system and subscriber number. This enables the subscribers to be grouped according to system number, for example to separate the external heat source in the LON as well.

Note
To avoid communication conflicts, every subscriber number within a system may only be assigned once. The Vitocom communication interface always has subscriber number 99.

Menu
- **"Device settings"**
- **"Programming"**
- **"Communication"**
- **"Subscriber number"** or **"System number"**

Subscriber number
Delivered condition: 1
Setting: 1 to 99

System number
Delivered condition: 1
Setting: 1 to 5

5366 335 GB

7779 Fault manager

Device is fault manager within a system.

This parameter determines whether the device should collect and display all system fault messages. Furthermore, the control unit monitors all subscribers for failure and generates central fault messages.

"Yes" Device is fault manager.
"No" Device is not fault manager.

Note
Only one device may be configured as fault manager within a system. Exception: The Vitocom remote monitoring systems may also be fault managers.

Menu
- **"Device settings"**
- **"Programming"**
- **"Communication"**
- **"Fault manager"**

Delivered condition	No
Setting	Yes/No

7797 Outside temperature

Transmit/receive the current outside temperature within a system.

If several subscribers use the current outside temperature value, this can be made available centrally by one device within a system. All other subscribers in the same system can receive the temperature values.

"0" Device captures the outside temperature via the locally connected temperature sensor.
"1" Device captures outside temperature of another LON subscriber within the same system.
"2" Device transmits outside temperature. All LON subscribers within the same system can receive the values.

Note
Only one of the subscribers within a system may transmit the outside temperature.

Menu
- **"Device settings"**
- **"Programming"**
- **"Communication"**
- **"Outside temperature"**

Delivered condition	0
Setting	0 / 1 / 2

5366 335 GB

779C Receive heartbeat

Receive interval for the values and messages transmitted via LON.

If no signal is received for a size or message within this cycle time, the control unit sets this value or status to an internal preset until the corresponding value is received again.

Menu
- **"Device settings"**
- **"Programming"**
- **"Communication"**
- **"Receive heartbeat"**

Delivered condition	20 min
Setting	0 to 60 min

77FF Time

Transmit/receive the time within a system.

This parameter determines the source from which the heat pump control unit receives the time and whether this is sent via LON to other subscribers.

"0" Device receives time from the internal clock of the control unit.

"1" Device receives time from another LON subscriber within the same system.

"2" Device transmits the time from the internal clock of the control unit. All LON subscribers within the same system can receive the time signal.

Note
For all devices in a system to run synchronously, one device must transmit the time and all other devices in the same system must receive it.

Menu
- **"Device settings"**
- **"Programming"**
- **"Communication"**
- **"Time"**

Delivered condition	0
Setting	0 / 1 / 2

5366 335 GB

7C00 Auto. su/w. time

Automatic summer/wintertime changeover.

In the delivered condition, the changeover will always take place in the night from Saturday to Sunday on the last weekend in March and October. This setting can be changed with parameters **"Summertime - month"** (7C01), **"Summertime - week"** (7C02), **"Summertime - day"** (7C03), **"Wintertime - month"** (7C04), **"Wintertime - week"** (7C05), and **"Wintertime - day"** (7C06).

"Yes" Automatic changeover enabled.
"No" Automatic changeover not enabled.

Menu
- **"Device settings"**
- **"Programming"**
- **"Time"**
- **"Auto. su./wi. time"**

Delivered condition	Yes
Setting	Yes/No

7C01 Summertime - month

Month to change over to summertime.

Menu
- **"Device settings"**
- **"Programming"**
- **"Time"**
- **"Summertime - month"**

Delivered condition	3
Setting	1 to 12

7C02 Summertime - week

Week to change over to summertime.

7C02 Summertime - week (cont.)

"1" to **"4"**
Week number, going up from the first week in the month. First to fourth week.
"5" Last week of month.
"6" to **"9"**
Week number, going down from the last week in the month. Second-to-last to fifth-to-last week.
Example:
A setting value of 7 gives the third-to-last week of a month.
"10" to **"14"**
Special date function to calculate the changeover day:
[Setting value (10 to 14) – 10] · 7 + **"Summertime - day"**
Example:
If the weekday with 6 is selected, the following data is produced with setting values 10 to 14:
10 [10–10] · 7 + 6 = 6
13 [13–10] · 7 + 6 = 27

Menu
- **"Device settings"**
- **"Programming"**
- **"Time"**
- **"Summertime - week"**

Delivered condition	5
Setting	1 to 14

7C03 Summertime - day

Weekday to change over to summertime.

Menu
- **"Device settings"**
- **"Programming"**
- **"Time"**
- **"Summertime - day"**

Delivered condition	7
Setting	1 to 7

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7C04 Wintertime - month

Month to change over to wintertime.

Menu
- **"Device settings"**
- **"Programming"**
- **"Time"**
- **"Wintertime - month"**

Delivered condition 10
Setting 1 to 12

7C05 Wintertime - week

Week to change over to wintertime.

"1" to **"4"**
Week number, going up from the first week in the month. First to fourth week.

"5" Last week of month.

"6" to **"9"**
Week number, going down from the last week in the month. Second-to-last to fifth-to-last week.
Example:
A setting value of 7 gives the third-to-last week of a month.

"10" to **"14"**
Special date function to calculate the changeover day:
[Setting value (10 to 14) – 10] · 7 + **"Wintertime - day"**
Example:
If the weekday with 6 is selected, the following data is produced with setting values 10 to 14:
10 [10–10] · 7 + 6 = 6
13 [13–10] · 7 + 6 = 27

Menu
- **"Device settings"**
- **"Programming"**
- **"Time"**
- **"Wintertime - week"**

Delivered condition 5
Setting 1 to 14

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7C06 Wintertime - day

Weekday to change over to wintertime.

Menu	Delivered condition	7
■ **"Device settings"**	Setting	1 to 7
■ **"Programming"**		
■ **"Time"**		
■ **"Wintertime - day"**		

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Keyword index

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Keyword index (cont.)

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Applicability

WPR 300 heat pump control unit
for

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