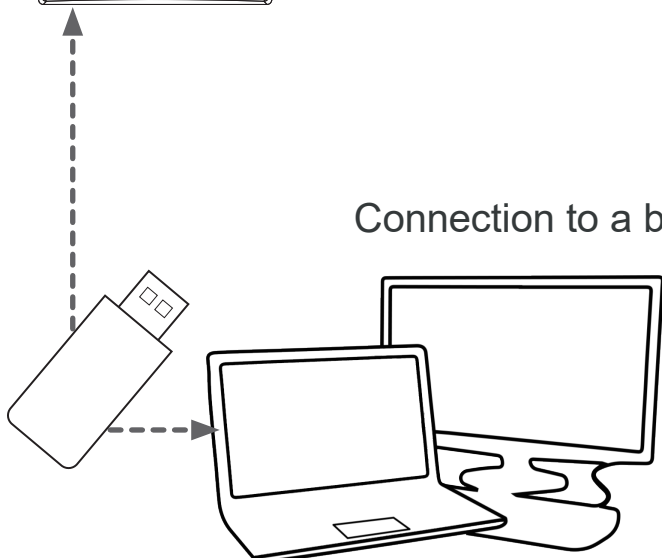
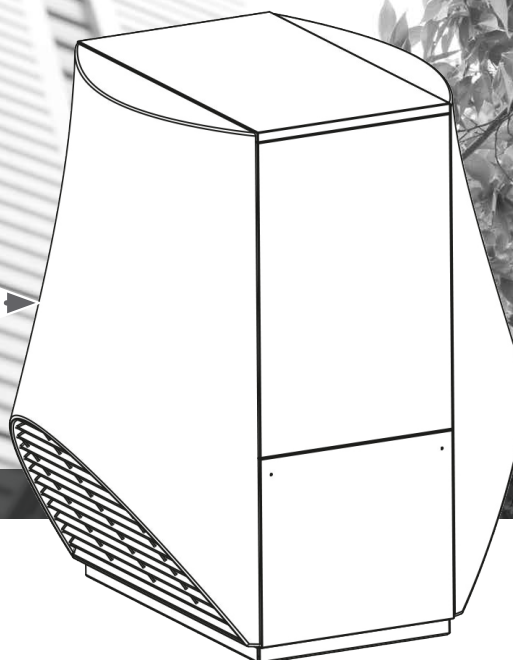
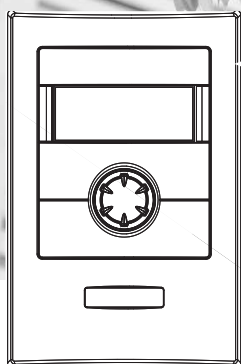
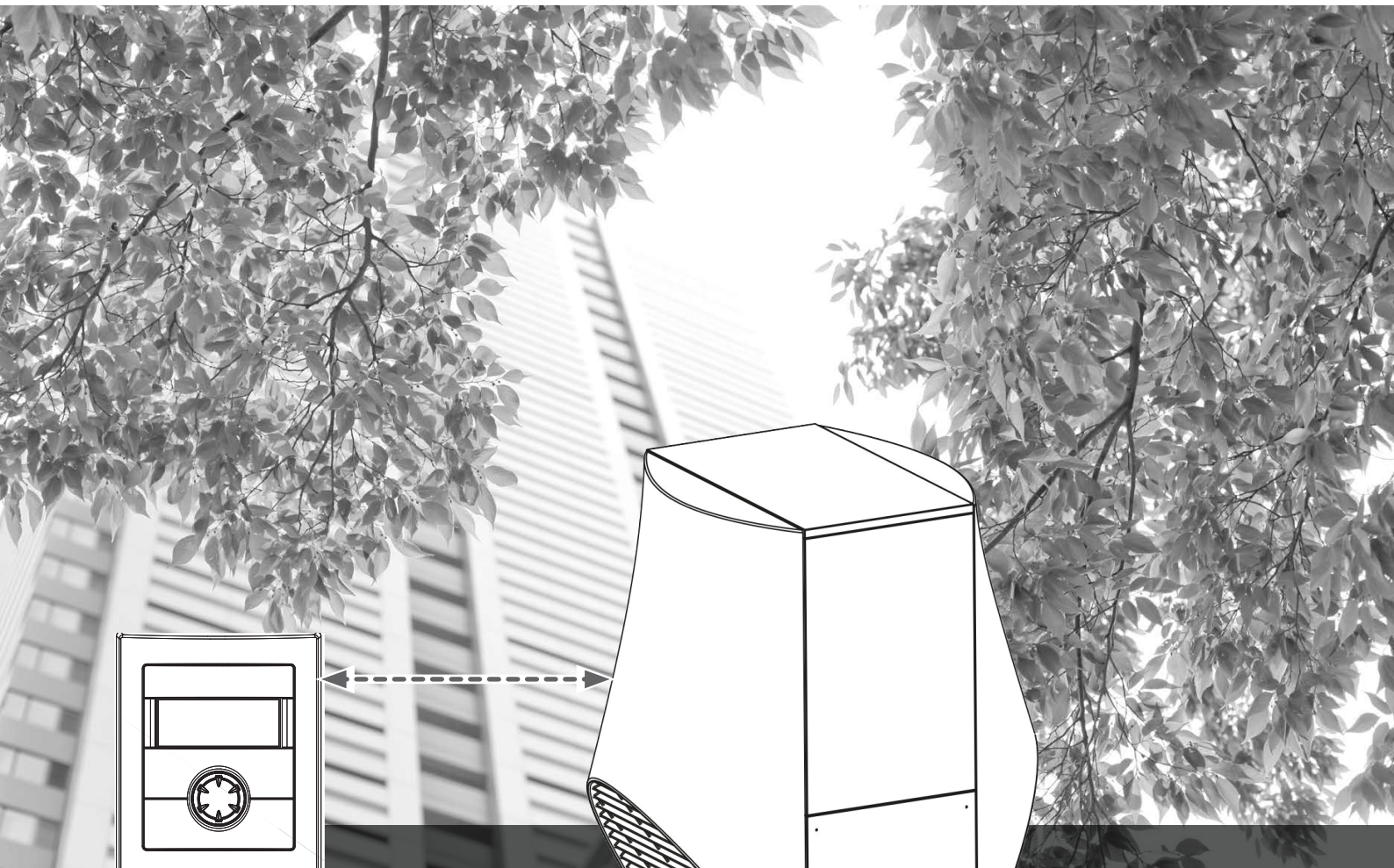


the better way to heat



Accessory for heat pumps
Connection to a building services management system via
BACnet/IP | ModBus/TCP

Operating Manual

alpha connect



UK



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Symbols in the document

Symbol	Meaning
	Information for specialist
✓	Prerequisite for an action
►	Single-step instruction for action
1., 2., 3., ...	Numbered step within a multi-step instruction for action. Adhere to the given sequence.
	Additional information, e.g. a note for making work easier, information on standards
→	Reference to further information elsewhere in the operating manual or in another document
•	List



1 Requirements for the use of a building services management system (BMS)

1.1 Software Requirements

For BACnet/IP

- ✓ Software version of the heating and heat pump controller ≥ V1.60

For ModBus/TCP

- ✓ Software version of the heating and heat pump controller ≥ V1.74/V2.74/V3.76/V4.76.



NOTE

Only BACnet/IP can be configured for systems with a software older than the ModBus/TCP states.

Under the menu item *Service > Information > BMS* the following display can be seen on the screen of the control unit of the heating and heat pump controller if the system is not configured:



If the item *BMS* (BACnet for software versions < V3.76) under *Service > Information* is missing, the software version of the controller is older than V1.60. BMS cannot be used.

1.2 Network connection

Knowledge of the basics and functions of a building services management system (BMS) as well as the programming of BACnet and ModBus.

For configuration, a Windows computer must be connected to a functioning network or directly to the heat pump to be configured.

The computer must have an IP address, which it is either assigned by the controller with activated DHCP server (→ „Variante A: Wärmepumpenregler als DHCP-Server“, page 3), by another DHCP server in the network (→ „Variante B: Wärmepumpenregler als DHCP-Client“, page 3) or which is assigned manually (→ „Variante C: Manuelle Konfiguration der IP-Einstellungen“, page 3).

Variant A:

Heat pump controller as DHCP server

1. Activate DHCP server on the control panel of the heating and heat pump controller under *Service > Control panel > Webserver*.



2. Configure the computer as a DHCP client.

Variant B:

Heat pump controller as DHCP client

1. Activate DHCP-client on the control panel under *Service > Control panel > Webserver*.



2. Configure the computer as a DHCP client as well.

Computer and heat pump controller are assigned IP addresses by a DHCP server in the network (e.g. by a router).

Variant C:

Manual configuration of the IP settings

1. Deactivate the DHCP server and DHCP client on the control panel.
2. Make the IP settings on the control panel under *Service > Control panel > IP-Adress*.



3. An IP address, different to that of the controller IP, must then be set in the same network at the computer.

Example:

Controller-IP 192.168.001.005 > Computer has the IP address 192.168.001.010.



NOTE

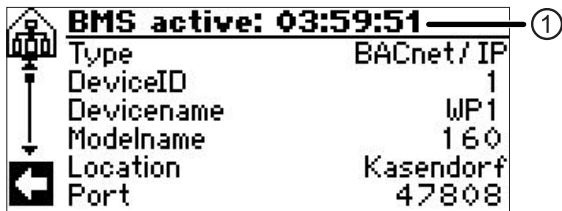
If the broadcast address is set incorrectly, the heat pump controller is not found via BACnet/IP!

Once the network is set up, the heat pump and computer can communicate with each other.

1.3 Test phase after configuration with the alpha connect tool

- ✓ The configuration with the alpha connect tool (→ Kapitel 2 „alpha connect Tool“, from page 5) is completed.

The menu item *Service > Information > BMS* now appears as follows:



In the title bar (1) the remaining test time is shown, below it the set values.

- If necessary, integrate the heat pump into the address range of the BMS network.
→ “1.5 Integration into a BMS network”, page 5)

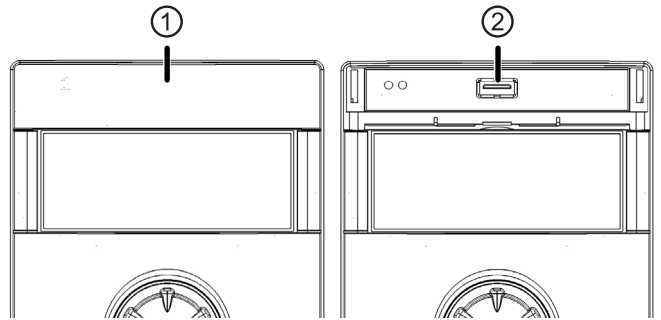
If 4 hours have elapsed, BMS is automatically deactivated. For further testing the BMS can be restarted with the alpha connect tool.

1.4 Permanent activation

The USB dongle supplied with this manual contains a license required to permanently unlock the BMS.

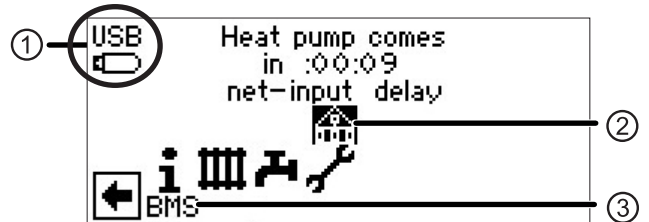
1. Uncover the USB connection on the control panel of the heating and heat pump controller.
2. Plug the USB dongle into the USB port.

Example: Control panel of the wall-mounted controller

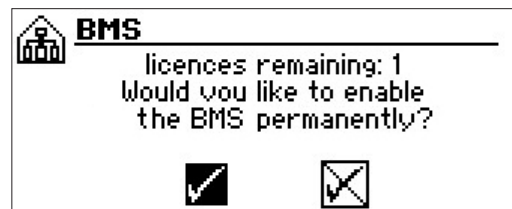


- 1 Flap above the display of the control unit
- 2 USB port

When the USB dongle is plugged into the USB port on the control panel of the heating and heat pump controller, a USB icon (1), a BMS icon (2) and BMS (3) appear on the navigation screen.



3. If the USB icon (2) is selected, the remaining licenses are displayed as well as the question whether BMS should be permanently activated.



4. When confirmed, the license is debited from the USB dongle and the following display appears:





Under the menu item *Service > Information > BMS* you can now see the following display:

For BACnet/IP:

	BMS active	
Type	BACnet/ IP	
DeviceID	1	
Devicename	WP1	
Modelname	160	
Location	Kasendorf	
Port	47808	

For ModBus/TCP:

	BMS active	
Type	ModBus/ TCP	
DeviceID	1	
Devicename	WP1	
Port	502	



NOTE

A change between BACnet/IP and ModBus/TCP is possible at any time by changing the configuration in the alpha connect tool.

1.5 Integration into a BMS network

The address range of the BMS network may differ from that set in the heating and heat pump controller. In addition, an IP address manually assigned to the heat pump can already be occupied in the BMS network and lead to conflicts in the network.

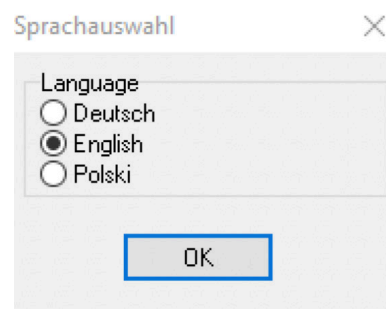
For the heat pump(s) to be integrated into the BMS network, the address range and IP addresses must be coordinated with the building control engineer and, if necessary, corrected in the heating and heat pump controller by using variant C (→ page 3).

2 alpha connect tool

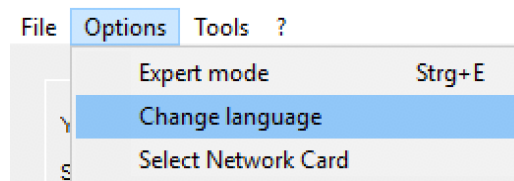
The alpha connect tool (executable Windows program) can be found on the USB dongle supplied with this manual.

2.1 Language selection

When the tool is executed for the first time, the following appears automatically:



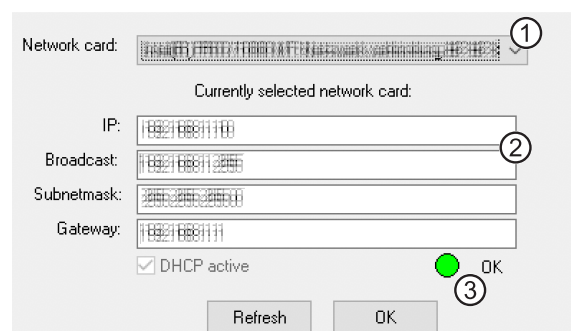
If the language is to be changed later, the language selection window can be called up again via the options menu:



2.2 Network card selection

The tool detects the correct network card automatically and does not have to be configured any further.

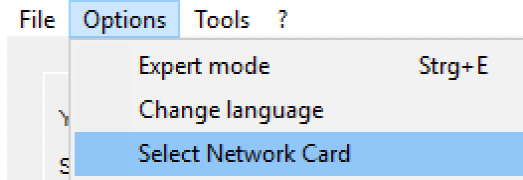
If detection is not possible (several network cards and IP addresses), the network card selection window opens:



- 1 Currently selected network card
- 2 IP data of the current network card
- 3 Status display. Only network cards with green status are suitable.



If it should become necessary later to change the network card, open the network card selection window via the options menu:



2.3 Men bar

File Options Tools ?

Exit the tool.

File Options Tools ?

Switching between standard and expert mode, changing the language and selecting the network card.

File Options **Tools** ?

Additional functions for BACnet/IP or ModBus/TCP configuration and broadcast calculator.

→ “2.6 Additional functions”, page 11

File Options Tools ?

Information about the software version of the tool and possible updates.

→ “2.5 Software version and update”, page 10

2.4 Execution types

The standard mode is automatically activated when the tool is started for the first time.

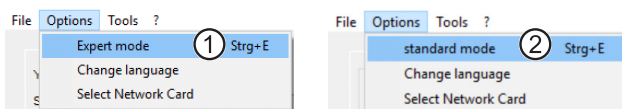
At later starts the window of the last used mode will be opened.

→ “2.4.1 Standard mode”, from page 6

→ “2.4.2 Expert mode”, from page 8

Switching between execution types

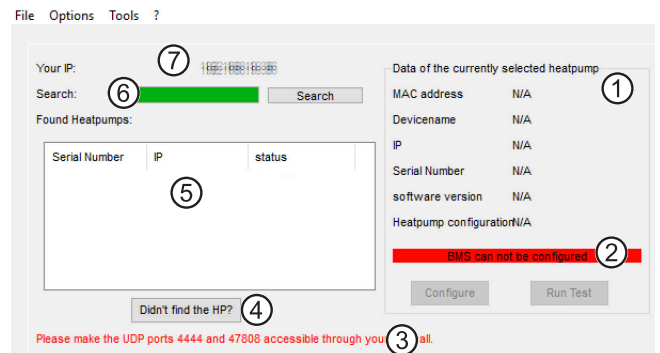
Either use the key combination CTRL+E or select the desired type of execution via the options menu.



- 1 Switching from standard mode to expert mode
- 2 Switching from expert mode to standard mode

2.4.1 Standard mode

When the tool is started, a broadcast call automatically starts to all heat pumps in the same network (direct environment).



NOTE

UDP ports in the firewall of the computer / network (3) may still have to be released.

Your IP (7)

IP address of the computer.

Search (6)

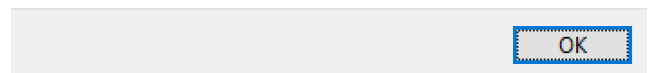
The bar indicates the search progress.

A click on *Search* starts the search again.

If no heat pump can be found, the following appears:



No HP have been found. Please enter IP manually.



Clicking on *OK* opens the window for manually entering the IP address of the heat pump.

→ “Didn't find the HP? (4)”, page 7

Found Heat pumps (5)

Heat pumps found are listed with their serial number, IP and BMS status.

Clicking on a list entry selects the corresponding heat pump for configuration or display of its data.

BMS status of found heat pumps:

Not possible

BMS is not possible with the software version of the heating and heat pump controller of the corresponding heat pump. Please update.

Possible

BMS is in principle possible with the corresponding heat pump, but not yet activated.



Test run

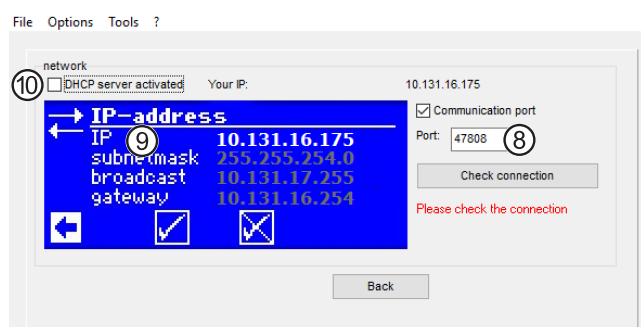
BMS has been configured and is running in the heating and heat pump controller of the corresponding heat pump in test mode (BMS not licensed → “1.4 Permanent activation”, page 4).

Activated

BMS is already licensed and active in the heating and heat pump controller of the corresponding heat pump.

Didn't find the HP? (4)

Clicking on *Didn't find the HP?* (4) opens the window for manually entering the IP of an existing heat pump (9).



Subnet mask, broadcast and gateway are taken from the currently selected network card and cannot be changed here.

- In the *IP* field (9), enter the IP specified in the control panel of the heating and heat pump controller of the heat pump under *Control panel > IP-Adress*.

Alternative:

- If the DHCP server is activated in the heating and heat pump controller, check the box *DHCP server activated* (10) to obtain the IP automatically.
- Check whether the *port* (8) is set correctly.

You can remove the hook from *communication port* to accept the standard port of the heating and heat pump controller.

Otherwise – if *communication port* is checked – enter the port valid for your network in the Port field.

- Click on *Check connection*.

The tool may issue warning messages indicating that network data has been entered incorrectly. Then correct the data accordingly and click *Check connection* again.

If the entered network data is correct, the tool displays the message “*Connection check successful*”.

Clicking on *Back* takes you back to the screen of the standard mode.

Data of the currently selected heatpump (1) (2)

Extended data (1) for one of the heat pumps found and selected in the list *Found Heatpumps*.

The current BMS status of the corresponding heat pump is highlighted (2).



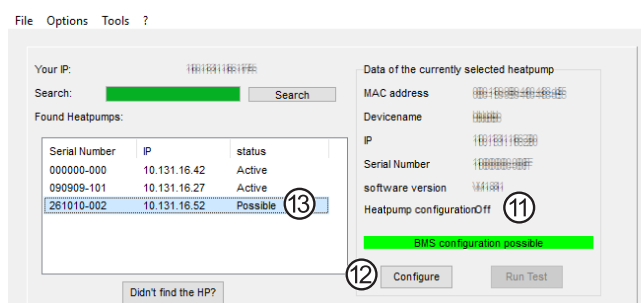
NOTE

The *devicename* is the alias of the heat pump on the BACnet/IP level, therefore unconfigured BACnet/IP systems will not provide a name.

Devicename is irrelevant for ModBus/TCP.

Status “Possible”

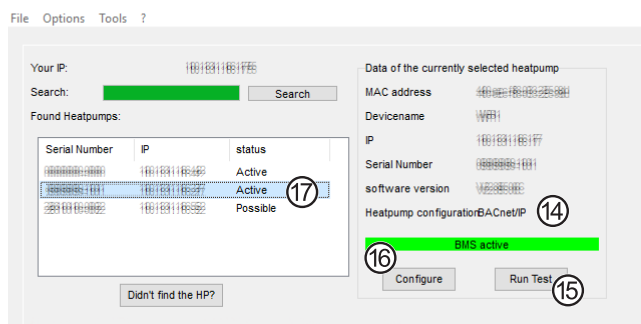
If BMS is possible (13) but not yet configured for a heat pump selected in the list *Found Heatpumps*, the message ‘Off’ (11) appears in the *Heat pump configuration* field. Then click on *Configure* (12) to start the BMS configuration of this heat pump.



Status “Activated”

If BMS is active (17) for a heat pump selected in the list *Found Heatpumps*, the type of configuration appears in the *Heat pump configuration* field: BACnet/IP (14) or ModBus/TPC.

The buttons *Configure* (16) and *Run Test* (15) can be clicked.





Configure (16) and Run Test (15)

Configure can only be carried out for heat pumps for which BMS is possible.

Run Test is only available for heat pumps with configured BMS.

Further details on configuring and testing, refer to the Expert Mode section:

→ “Settings (4)”, page 8

→ “Save & Run Test”, page 9

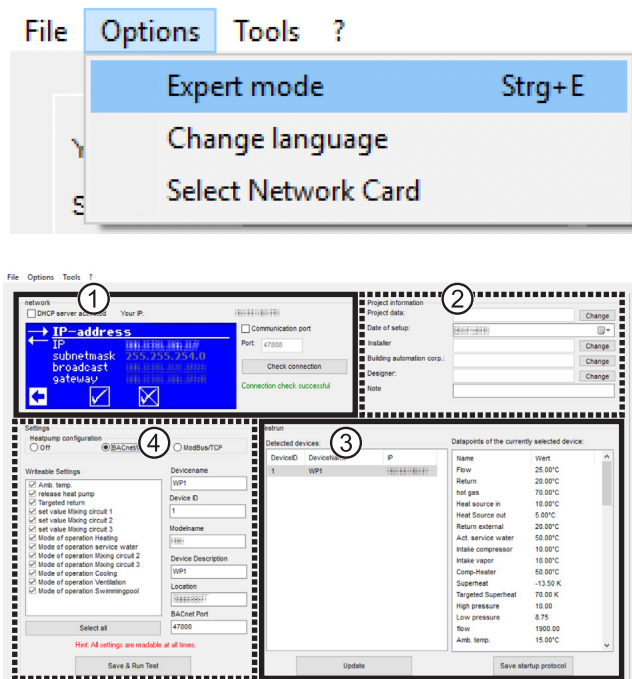


NOTE

In standard mode, there is always a *Back* button under *Configure* and *Run Test* to discard entries made and return to the previous Tool window.

2.4.2 Expert mode

1. In standard mode, select a BMS-capable heat pump from the list *Found Heat pumps*.
2. Switch to expert mode.



- 1 Network section
→ “Didn’t find the HP? (4)”, page 7
- 2 Project information section
→ “Project information (2)”, page 10
- 3 Testrun section
→ “Testrun (3)”, page 9
- 4 Settings section
→ “Settings (4)”, page 8



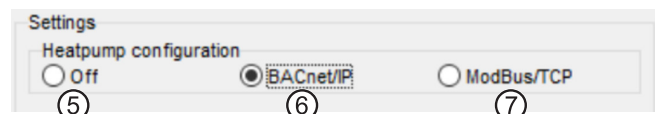
NOTE

The list entries in sections 3 and 4 depend on the local conditions of the respective system or the selected heat pump.

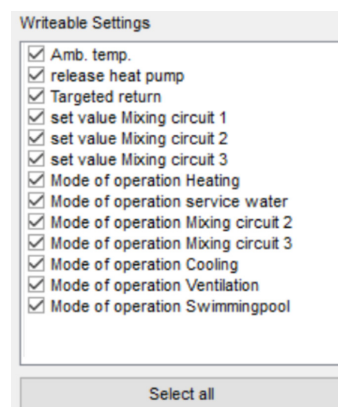
The list entries in these sections are always displayed in the language set in the heating and heat pump controller of the respective heat pump.

→ Heating and heatpump controller:
Service > Language

Settings (4)



- 5 Off
BMS may be licensed but not yet activated in the heating and heat pump controller (→ “1 Requirements for the use of a building services management system (BMS)”, from page 3). The heat pump controller does not listen to BACnet/IP or ModBus/TCP requests.
- 6 BACnet/IP
BMS is configured to BACnet/IP. The heat pump controller listens to the communication port specified in the Network (1) section (standard: 47808).
- 7 ModBus/TCP
BMS is configured to ModBus/TCP. The heat pump controller listens for incoming connections under TCP port 502.
For systems where ModBus/TCP is not available, only BACnet/IP can be configured.



The list entries correspond to the writable data points of the heating and heat pump controller of the selected heat pump.
If a check mark is set, this means *writable*.



Text fields to be filled in to identify the selected heat pump in the BMS network.

for BACnet/IP

Devicename	WP1
Device ID	1
Modelname	1000
Device Description	WP1
Location	XXXXXXXXXX
BACnet Port	47808

for ModBus/TCP

Devicename	WP1
NAD	1

BACnet/IP: The *Device ID* must be unique in the complete BMS network.

ModBus/TCP: The *device name* is used exclusively for identification by the tool and has no effect on the BMS.

NAD is an additional network address. BMS reacts only to commands sent to this address.

Exception: The value 0 is assumed to be 'broadcast' and is therefore invalid.

Save & Run Test

By clicking on *Save & Run Test*, BMS is activated and a test run of this heat pump starts.

During the test, the tool searches for the currently selected heat pump.

With BACnet/IP this is done via a *Who Is* (broadcast).

For a configuration with BACnet/IP, a status window is displayed during the test run. If the test run is completed, it must be closed manually.

Querying Data	
Testrun successful 0 seconds	
<input checked="" type="radio"/>	Execute "Who Is"
<input checked="" type="radio"/>	Searching for HP
<input checked="" type="radio"/>	Querying Data
<input checked="" type="radio"/>	Querying temperatures
<input checked="" type="radio"/>	Testrun successful
<input type="button" value="Close"/>	

With ModBus/TCP the heat pump is addressed directly.

Testrun (3)

If the set heat pump is listed in the list of *Detected Devices*, testing of the settings was successful.

Testrun		
Detected devices:		
DeviceID	DeviceName	IP
1	WP1	192.168.1.100
<input type="button" value="Update"/>		

After a test, the list of *Detected Devices* can be updated by clicking on the corresponding button.



NOTE

In a system configuration with ModBus/TCP, only the currently processed heat pump is displayed; in a system configuration with BACnet/IP, all heat pumps found in the network are displayed.

If a heat pump is selected from the list *Detected Devices*, the tool automatically queries the list of data points for this device as well as the current values and displays them.

for BACnet/IP

Datapoints of the currently selected device:	
Name	Wert
Flow	25.00°C
Return	20.00°C
hot gas	70.00°C
Heat source in	10.00°C
Heat Source out	5.00°C
Return external	20.00°C
Act. service water	50.00°C
Intake compressor	10.00°C
Intake vapor	10.00°C
Comp-Heater	50.00°C
Superheat	-13.50 K
Targeted Superheat	70.00 K
High pressure	10.00
Low pressure	8.75
flow	1900.00
Amb. temp.	15.00°C
<input type="button" value="Save startup protocol"/> ⑧	

for ModBus/TCP

Datapoints of the currently selected device:	
Name	Wert
Error reset	Off
Watchdog	Off
heat. sys. pump	On
ventilation	Off
suppl. pump	On
DHW pump	Off
fan-heats.pump	On
CP	Off
floor heat. pump 1	Off
floor heat.pump3	Off
solar pump	Off
pool pump	Off
VSK	Off
FRH	Off
Energy supply compa...	On
El. Sup. bl. 2	Off
<input type="button" value="Save startup protocol"/> ⑧	



NOTE

If a device has too many data points, the list may be incomplete.



NOTE

The displayed values correspond to all available data points, however it is not possible to query the names, resolution or units of the data points via ModBus/TCP.

Save startup protocol (8)

By clicking on *Save startup protocol*, all relevant data about the selected device can be exported and saved in csv format.

Project information (2)

- Enter and save the key data for the current project here by clicking on *Change*.

Project information dialog box with the following fields and buttons:

- Project data: [text field] [Change]
- Date of setup: [date field] [dropdown arrow]
- Installer: [text field] [Change]
- Building automation corp.: [text field] [Change]
- Designer: [text field] [Change]
- Note: [text field]



NOTE

In standard mode, this window appears automatically if the startup protocol is to be saved at the end of the test routine. It also contains the *Save* button.

Input masks:

Input masks dialog box with the following fields and buttons:

- First name: [text field]
- Name: [text field]
- Address: [text field] Nr. [text field]
- Postal code & Location: [text field] [text field]
- Phone: [text field]
- E-Mail: [text field]
- [Save] [Cancel]



NOTE

The field *First name* is locked in the input mask *Project data*.

The saved data are available each time the tool is re-opened.

2.5 Software version and update

Software version and update dialog box with the following fields and buttons:

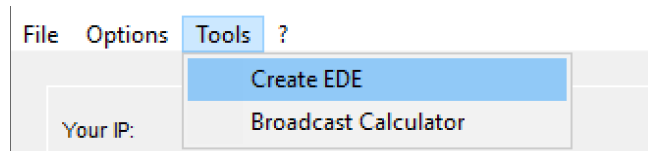
- File Options Tools ?
- Information
- ① Version 3.83.0.1
- ② Created at: May 25 2018
- ③ [Update program]
- ④ ☒ Check for Update on startup
- [Close]

- 1 Version number of the tool
- 2 Date of version creation
- 3 Search for update with dialog box at the end of the search run
- 4 If activated, the tool automatically searches for a newer version every time it is started



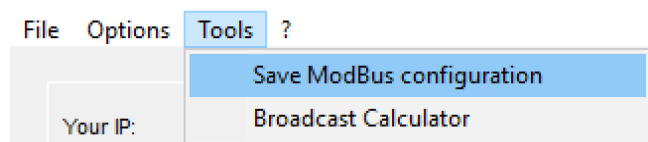
2.6 Additional functions

BACnet/IP



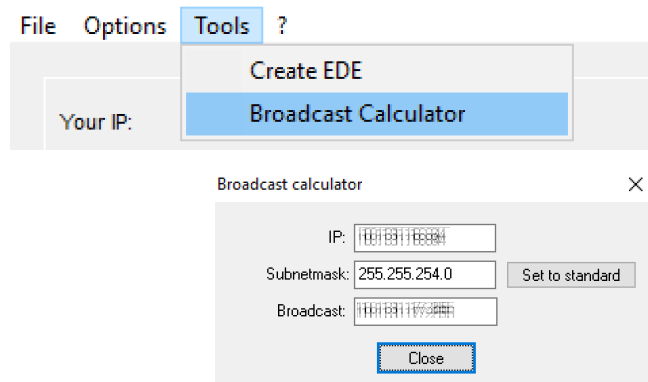
The EDE files relevant for the BMS technician are output according to the BACnet/IP standard for the currently configured heat pump.

ModBus/TCP



The ModBus/TCP configuration of the currently selected heat pump is stored externally in csv format. In the csv file you can see which data have been read and whether they can be written or not.

Broadcast calculator



The broadcast calculator can be used to determine the highest IP address to be assigned in the network.

2.7 What you should note

- The license is stored on the motherboard for V1.xx and V2.xx, on the control panel of the heating and heat pump controller for V3.xx and V4.xx. If the corresponding component needs to be replaced, a new license is required (contact Customer Service).
 - The configuration is stored on the control panel of the heating and heat pump controller. If the control panel is defective, the BMS must be reconfigured.
 - If a heat pump is not found by the tool:
 - ▶ Check IP address of heat pump and port setting.
- “Didn’t find the HP? (4)”, page 7
- ▶ Check the Broadcast Address with the Broadcast Calculator.
 - If the connection between heatpump and BMS fails the device carries on running with the most recent entries.
 - If the outside temperature is preset the outside temperature sensor in the device must be disconnected.
 - If pumps that are normally controlled by the heating and heat pump controller are to be controlled by an external controller, first contact the manufacturer to clarify the necessary interface.



3 BACnet Specification

3.1 Available control functions

- Integration in a higher-level building services control system
- All temperatures can be read out.
- Outdoor temperature, return setpoint temperature and the three mixing circuit setpoint temperatures can be preset.
- Faults can be read out with error number and description.
- Faults can be acknowledged.
- Current operating state and the number of compressors currently running can be read out.
- All operating modes (Heating mode, Domestic hot water, ...) can be preset.
- Number of released compressors can be predefined (Block, 1VD, 2VD)
- The current heat quantities can be read out.
- Date and time of the heat pump controller can be synchronised.
- Device can be restarted.

3.2 Supported BACnet functions

BACnet Protocol Revision: 1 Rev. 10

BACnet-Profile: *BACnet Application Specific Controller (B-ASC)*

Implemented BACnet *Interoperability Building Blocks* (BIBBs):

- DS-RP-B
Data Sharing-ReadProperty-B
- DS-WP-B
Data Sharing-WriteProperty-B
- DM-DDB-B
Device Management-Dynamic Device Binding-B
- DM-DOB-B
Device Management-Dynamic Object Binding-B
- DM-DCC-B
Device Management-DeviceCommunicationControl-B
- DS-RPM-B
Data Sharing-ReadPropertyMultiplex-B
- DS-COV-B
Data Sharing COV-B
- DM-TS-B oder DM-UTC-B
Device Management-TimeSynchronization or Device Management-UTCTimeSynchronization-B
- DM-RD-B
Device Management-ReinitializeDevice-B

Segmentation capability:

- Segmented requests supported.
Window Size: 16
- Segmented responses supported.
Window Size: 16

Data Link Layer: BACnet IP (Annex J)

Character Sets: ANSI X3.4

Available Standard ObjectTypes

Analog Input Binary Input Device Multistate Input Multistate Value Accumulator	Dynamically creatable: No Dynamically deletable: No Proprietary properties: None Property range restrictions: up to 48 characters
Analog Value Binary Output	Dynamically creatable: No Dynamically deletable: No Proprietary properties: None Writable properties: Present_Value Property range restrictions: up to 48 characters

Transport system / transmission route:

Ethernet interface of the heating and heat pump controller.



3.3 BACnet Checklist

Data required	Example	Your data
IP-adress	192.168.1.2	
Subnet mask	255.255.255.0	
Broadcast adress	192.168.1.255	
Gateway	192.168.1.1	
UDP-Port	47808	
Devicename	WP1	
Device-ID	1234	
Modelname	LWCV 82R1/3	
Device Description	Heatpump	
Location	Kasendorf	

NOTE
The BACnet device ID must be unique in the complete BMS-net.

Access to data points	R	R / W
Outdoor temperature	<input type="checkbox"/>	<input type="checkbox"/>
Release heat pump	<input type="checkbox"/>	<input type="checkbox"/>
Return setpoint temperature	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 1 setpoint temperature (flow)	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 2 setpoint temperature (flow)	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 3 setpoint temperature (flow)	<input type="checkbox"/>	<input type="checkbox"/>
Heating mode	<input type="checkbox"/>	<input type="checkbox"/>
Domestic hot water mode	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 2 mode	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 3 mode	<input type="checkbox"/>	<input type="checkbox"/>
Cooling mode	<input type="checkbox"/>	<input type="checkbox"/>
Swimming pool mode	<input type="checkbox"/>	<input type="checkbox"/>
Ventilation mode	<input type="checkbox"/>	<input type="checkbox"/>

R = read only | R / W = Read and write
Please tick the respective box

3.4 Data points (BACnet ObjectTypes)

NOTE
Data points highlighted in light grey require an installed comfort / expansion board or ventilation board to be installed.
Data point for units with LIN- and / or ModBus are marked with *.
If a data point is not visible on the control panel of the heating and heat pump controller, the values are to be regarded as invalid or ineffective.

NOTE
Data points with *Analog Value* or *Multistate Value* are writable.

Description of the data points:

→ Operating manual of the heating and heat pump controller

3.4.1 Analog Inputs

	Analog Input	Analog Value	Unit	Resolution
Flow temperature	1	–	°C	0.1 °C
Return temperature	2	–	°C	0.1 °C
Hot gas temperature	3	–	°C	0.1 °C
Heat source inlet	4	–	°C	0.1 °C
Heat source outlet	5	–	°C	0.1 °C
Mixing circuit 1 flow	6	–	°C	0.1 °C
External return	7	–	°C	0.1 °C
Room remote adjuster 1	8	–	°C	0.1 °C
Mixing circuit 2 flow	9	–	°C	0.1 °C
Room remote adjuster 2	10	–	°C	0.1 °C
Mixing circuit 3 flow	11	–	°C	0.1 °C
Room remote adjuster 3	12	–	°C	0.1 °C
Solar collector	13	–	°C	0.1 °C
Solar storage tank	14	–	°C	0.1 °C
External energy source	15	–	°C	0.1 °C
Outdoor temperature If the outdoor temperature is preset via BACnet > disconnect sensor in the device.	16	1	°C	0.1 °C
Return setpoint temperature	17	2	°C	0.1 °C
Mixing circuit 1 setpoint Flow	18	3	°C	0.1 °C



	Analog Input	Analog Value	Unit	Resolution
Mixing circuit 2 setpoint Flow	19	4	°C	0.1 °C
Mixing circuit 3 setpoint Flow	20	5	°C	0.1 °C
Supply air temperature	21	–	°C	0.1 °C
Domestic hot water actual temperature	22	–	°C	0.1 °C
Domestic hot water temperature desired value	23	6	°C	0.1 °C
* Compressor intake temperature	24	–	°C	0.1 °C
* Evaporator intake temperature	25	–	°C	0.1 °C
* Compressor heater temperature	26	–	°C	0.1 °C
* Overheating	27	–	K	0.1 °K
* Overheating setpoint	28	–	K	0.1 °K
* Pressure High pressure	29	–	bar	0.01 bar
* Pressure Low pressure	30	–	bar	0.01 bar
RBE room temperature actual	31	–	°C	0.1 °C
RBE room temperature, setpoint	32	–	°C	0.1 °C
Current flow	33	–	l/h	1 l/h
Heating curve heating end point	34	7	°C	0.1 °C
Heating curve heating parallel shift	35	8	°C	0.1 °C
Heating curve Mixing circuit 1 end point	36	9	°C	0.1 °C
Heating curve Mixing circuit 1 parallel shift	37	10	°C	0.1 °C
Heating curve Mixing circuit 2 end point	38	11	°C	0.1 °C
Heating curve Mixing circuit 2 parallel shift	39	12	°C	0.1 °C
Heating curve Mixing circuit 3 end point	40	13	°C	0.1 °C
Heating curve Mixing circuit 3 parallel shift	41	14	°C	0.1 °C
Temperature + –	42	15	°C	0.1 °C

3.4.2 Multistate Inputs

	Multistate Input	Multistate Value	States	
Operating state	1	–	1	Heating mode
			2	Domestic hot water
			3	Swimming pool
			4	El.Sup.bl.
			5	Defrost
			6	Off
			7	External energy source
			8	Cooling
Off / with numbers of active compressor(s)	2	–	1	Off
			2	1 compressor running
			3	2 compressors running
Block / release heat pump	–	1	1	Block heat pump
			2	Release 1 compressor
			3	Release 2 compressors
Maximum possible release when compressors are required.				
Mode of operation Heating	3	2	1	Automatic
			2	Second heat generator
			3	Party
			4	Holidays
			5	Off
Mode of operation Domestic hot water	4	3	1	Automatic
			2	Second heat generator
			3	Party
			4	Holidays
			5	Off
Mode of operation Mixing circuit 2	6	5	1	Automatic
			2	Second heat generator
			3	Party
			4	Holidays
			5	Off



	Multistate Input	Multistate Value	States	
Mode of operation Mixing circuit 3	7	6	1	Automatic
			2	Second heat generator
			3	Party
			4	Holidays
			5	Off
Mode of operation Cooling	8	7	1	Automatic
			2	Off
Mode of operation Ventilation	9	8	1	Automatic
			2	Party
			3	Holidays
			4	Off
Mode of operation Swimming pool	10	9	1	Automatic
			2	nicht benutzt
			3	Party
			4	Holidays
			5	Off
Smart Grid	11	10	1	El.Sup.bl.
			2	Smart Grid Low
			3	Standard
			4	Smart Grid High

3.4.3 Binary Inputs

	Binary Input	States	
Self-resetting fault	1	0	Inactive = no fault
In the event of a fault, the error number with associated description is in the Description and Active Text.		1	Active = Self-resetting fault
Non self-resetting fault	2	0	Inactiv = no fault
In the event of a fault, the error number with associated description is in the Description and Active Text.		1	Active = fault
Heat. sys. pump	3	0	Off
		1	On
VEN	4	0	Off
		1	On
CP	5	0	Off
		1	On
DHW pump	6	0	Off
		1	On
Fan-heats.pump	7	0	Off
		1	On
Circulation pump	8	0	Off
		1	On
CP2	9	0	Off
		1	On
CP3	10	0	Off
		1	On
Solar pump	11	0	Off
		1	On
Pool pump	12	0	Off
		1	On
VSK	13	0	Off
		1	On
FRH	14	0	Off
		1	On
Compressor 1	15	0	Off
		1	On
Compressor 2	16	0	Off
		1	On
2nd heat gen. 1	17	0	Off
		1	On
2nd heat gen. 2	18	0	Off

→ "5 Abbreviations", page 23



	Binary Input	States
	1	On
2nd heat gen. 3	19	0 Off 1 On
Defr/brin/flow	20	0 Off 1 On
Sw-therm switch	21	0 Off 1 On
El.Sup.bl.	22	0 Off 1 On
High pressure	23	0 Off 1 On
Motor protect.	24	0 Off 1 On
Low pressure	25	0 Off 1 On
Potent. ext.	26	0 Off 1 On
Pool therm.	27	0 Off 1 On
SAX	28	0 Off 1 On
SPL	29	0 Off 1 On
El.Sup.bl.2 (for Smart Grid)	30	0 If El.Sup.bl. = 0, then: Decreased operating mode If El.Sup.bl. = 1, then: Electric supplier block 1 If El.Sup.bl. = 0, then: Regular operation mode If El.Sup.bl. = 1, then: Increased operating mode

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3.4.4 Binary Outputs

	Binary Output	States
Error reset Outputs „0“ after „1“ has been sent.	1	0 without effect 1 Trigger reset
Heat. sys. pump	3	0 Automatic 1 On
VEN	4	0 Automatic 1 On
CP	5	0 Automatic 1 On
DHW pump	6	0 Automatic 1 On
Fan-heats.pump	7	0 Automatic 1 On
Circulation pump	8	0 Automatic 1 On
CP2	9	0 Automatic 1 On
CP3	10	0 Automatic 1 On
Solar pump	11	0 Automatic 1 On
Pool pump	12	0 Automatic 1 On
VSK	13	0 Automatic 1 On
FRH	14	0 Automatic 1 On

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3.4.5 Accumulators

	Accumulator	Unit	Resolution
Heat quantity heating	1	kWh	1 kWh
Heat quantity domestic hot water	2	kWh	1 kWh
Heat quantity swimming pool	3	kWh	1 kWh
Heat quantity total	4	kWh	1 kWh
Op. h. comp1	5	h	1 h
Duration comp. 1	6	h	1 h
Op. h. comp2	7	h	1 h
Duration comp. 2	8	h	1 h
Operation hours 2hg1	9	h	1 h
Operation hours 2hg2	10	h	1 h
Operation hours 2hg3	11	h	1 h
Operation hours hp	12	h	1 h
Operation hours heat	13	h	1 h
Operation hours hw	14	h	1 h
Operation hours cool	15	h	1 h
Operation hours SWoPV	16	h	1 h
Operation hours solar	17	h	1 h
Error memory	18	–	–
Only the current error is displayed.			

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4 ModBus Specification

The heating and heat pump controller supports the ModBus/TCP standard as the slave.

The ModBus/TCP data is provided in the form of registers. Four types are supported:

1. Discrete Inputs: Truth values (Boolean values), e.g. inputs. Read only.
2. Input Registers: Integer values of the control, e.g. temperatures. Read only.
3. Coils: Truth values (Boolean values), e.g. outputs. Writable.
4. Integer values of the control, e.g. setpoint values. Writable.

If a value is no longer to be predefined, a value outside the defined limits must be transferred. For coils, this means the value „0“; for holding registers it means a value outside the limits for the relevant data point in the appendix.



NOTE

When programming note that, that registers are 0-based.

4.1 Connection

ModBus/TCP shares the IP address of the control system and can be reached via the TCP port 502.

We recommend that you use the freeware qModMaster for the test (available at <http://sourceforge.net/projects/qmodmaster/>).

4.2 Available control functions

- Integration in a higher-level building services control system.
- Diverse data points can be read out (for example: temperatures, operating hours, operating modes, heat quantity).
- Outdoor temperature, return setpoint temperature and three mixing circuit setpoint temperatures can be preset.
- Faults can be read out with error number and description.
- Faults can be acknowledged.
- Diverse setpoints and operating modes as well as the outdoor temperature can be predefined.



4.3 ModBus-Checklist

Data required	Example	Your data
Devicename	WP1	
NAD	1	

Access to data points	R	R / W
Outdoor temperature	<input type="checkbox"/>	<input type="checkbox"/>
Release heat pump	<input type="checkbox"/>	<input type="checkbox"/>
Return setpoint temperature	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 1 setpoint temperature (flow)	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 2 setpoint temperature (flow)	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 3 setpoint temperature (flow)	<input type="checkbox"/>	<input type="checkbox"/>
Heating mode	<input type="checkbox"/>	<input type="checkbox"/>
Domestic hot water mode	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 2 mode	<input type="checkbox"/>	<input type="checkbox"/>
Mixing circuit 3 mode	<input type="checkbox"/>	<input type="checkbox"/>
Cooling mode	<input type="checkbox"/>	<input type="checkbox"/>
Swimming pool mode	<input type="checkbox"/>	<input type="checkbox"/>
Ventilation mode	<input type="checkbox"/>	<input type="checkbox"/>

R = read only | R / W = Read and write
Please tick the respective box

4.4 Data points



NOTE

Data points highlighted in light grey require an installed comfort / expansion board or ventilation board to be installed.

Data point for units with LIN- and / or ModBus are marked with *.

If a data point is not visible on the control panel of the heating and heat pump controller, the values are to be regarded as invalid or ineffective.

Description of the data points:

→ Operating manual of the heating and heat pump controller

4.4.1 Discrete Inputs (read only)

	ID
El.Sup.bl.	0
El.Sup.bl.2	1
Pool therm.	2
Comp1	3
Comp2	4
2nd heat gen. 1	5
2nd heat gen. 2	6
2nd heat gen. 3	7

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4.4.2 Input Register (read only)

	ID	Unit	Resolution
Average temperature	0	°C	10
Flow temperature	1	°C	10
Return temperature	2	°C	10
External return	3	°C	10
Domestic hot water temperatur	4	°C	10
Mixing circuit 1 flow	5	°C	10
Mixing circuit 2 flow	6	°C	10
Mixing circuit 3 flow	7	°C	10
Hot gas temperature	8	°C	10
Heat source inlet	9	°C	10
Heat source outlet	10	°C	10
Room remote adjuster 1	11	°C	10
Room remote adjuster 2	12	°C	10
Room remote adjuster 3	13	°C	10
Solar collector	14	°C	10
Solar storage tank	15	°C	10
External energy source	16	°C	10
Supply air temperature	17	°C	10
Extract air temperature	18	°C	10
* Compressor intake temperature	19	°C	10
* Evaporator intake temperature	20	°C	10
* Compressor heater temperature	21	°C	10
* Overheating	22	Kelvin	10
* Overheating setpoint	23	Kelvin	10
RBE room temperature actual	24	°C	10
RBE room temperature setpoint	25	°C	10
* High pressure	26	bar	100
* Low pressure	27	bar	100
Op. h. comp1	28	h	1 h
Op. h. comp2	29	h	1 h
Operation hours 2hg1	30	h	1 h
Operation hours 2hg2	31	h	1 h
Operation hours 2hg3	32	h	1 h
Operation hours hp	33	h	1 h
Operation hours heat	34	h	1 h
Operation hours hw	35	h	1 h
Operation hours SWoPV	36	h	1 h

→ "5 Abbreviations", page 23

	ID	States
System status	37	0 Heating mode
		1 Domestic hot water
		2 Swimming pool
		3 El.Sup.bl.
		4 Defrost
		5 Off
		6 External energy source
		7 Cooling

	ID	Unit	Resolution
Heat quantity heating (High*)	38	kWh	10
Heat quantity heating (Low*)	39	kWh	10
Heat quantity Domestic hot water (High*)	40	kWh	10
Heat quantity Domestic hot water (Low*)	41	kWh	10
Heat quantity Swimming pool (High*)	42	kWh	10
Heat quantity Swimming pool (Low*)	43	kWh	10
Heat quantity total (High*)	44	kWh	10
Heat quantity total (Low*)	45	kWh	10
Error memory	46	–	–
Only the current error is displayed.			
*) To determine the actual heat quantity, first move the value specified under <i>High</i> 16 bits to the left. Then add the value specified under <i>Low</i> .			



4.4.3 Coils (read / write)

Generally valid

- for read out: ,0' = Off, ,1' = On
- for writing: ,0' = Automatic, ,1' = On

Coils only have an effect if ,1' for „On“ is sent to them.

	ID	Description
Error reset	0	Acknowledges the currently queued error
–	1	Reserved, is not used
Heat. sys. pump	2	Forced switching on of the Heat. sys. pump
VEN	3	Forced switching on of the fan
CP	4	Forced switching on of the CP
DHW pump	5	Forced switching on of the DHW pump
heats.-pump	6	Forced switching on of the heatsource pump
Circulation pump	7	Forced switching on of the circulation pump
CP2	8	Forced switching on of the CP 2
CP3	9	Forced switching on of the CP 3
Solar pump	10	SForced switching on of the solar pump
Pool pump	11	Forced switching on of the pool pump
VSK	12	Forced switching on of the VSK
FRH	13	Forced switching on of the FRH

→ “5 Abbreviations”, page 23



4.4.4 Holding Register (read / write)

	ID	Unit	Resolution	Minimum	Maximum
Outdoor temperature	0	°C	10	-200	800
Return temperature setpoint	1	°C	10	150	800
Mixing circuit 1 flow temperature setpoint	2	°C	10	150	800
Mixing circuit 2 flow temperature setpoint	3	°C	10	150	800
Mixing circuit 3 flow temperature setpoint	4	°C	10	150	800
Domestic hot water temperature desired value	5	°C	10	150	800

	ID	Resolution	States (Multistate)	
Block / release heat pump	6	1	0	Block heatpump
			1	Release 1 Compressor
			2	Release 2 Compressors
Mode of operation Heating	7	1	0	Automatic
			1	Second heat generator
			2	Party
			3	Holidays
			4	Off
Mode of operation Domestic hot water	8	1	0	Automatic
			1	Second heat generator
			2	Party
			3	Holidays
			4	Off
Mode of operation Mixing circuit 2	9	1	0	Automatic
			1	Second heat generator
			2	Party
			3	Holidays
			4	Off
Mode of operation Mixing circuit 3	10	1	0	Automatic
			1	Second heat generator
			2	Party
			3	Holidays
			4	Off
Mode of operation Cooling	11	1	0	Off
			1	Automatic
Mode of operation Ventilation	12	1	0	Automatic
			1	Party
			2	Holidays
			3	Off
Mode of operation Swimming pool	13	1	0	Automatic
			1	not used
			2	Party
			3	Holidays
			4	Off



Smart Grid	ID	Resolution	States (Multistate)	
	14	1	0	El.Sup.bl.
			1	Smart Grid Low
			2	Standard
			3	Smart Grid High

	ID	Unit	Resolution	Minimum	Maximum
Heating curve heating end point	15	°C	10	200	700
Heating curve heating parallel shift	16	°C	10	50	350
Heating curve Mixing circuit 1 end point	17	°C	10	200	700
Heating curve Mixing circuit 1 parallel shift	18	°C	10	50	350
Heating curve Mixing circuit 2 end point	19	°C	10	200	700
Heating curve Mixing circuit 2 parallel shift	20	°C	10	50	350
Heating curve Mixing circuit 3 end point	21	°C	10	200	700
Heating curve Mixing circuit 3 parallel shift	22	°C	10	50	350
Temperature + –	23	°C	10	-50	50



5 Abbreviations

Abbreviation	Description
2hg	Second heat generator
2nd heat gen.	Second heat generator
BOSUP	Defrost/brine/flow
Comp	Compressor
CP	Compressor
Defr/brin/flow	Defrost/brine/flow
DHW	Domestic hot water
El.Sup.bl.	Electric supplier block
El.Sup.bl.2	Function for Smart Grid
FRH	Contactor Defroster heater
heat	Heating
Heat. sys. pump	Heating system pump
heats.-pump	Heating system pump
hp	Heat pump
hw	Domestic hot water
MC	Mixing circuit
Op. h.	Operation hour(s)
RBE	Room remote adjuster
SAX	Room remote adjuster: remote control shock ventilation
SPL	Switch-off contact for ventilation
SWoPV	Swimming pool or photovoltaics
Sw-therm	Swimming pool thermostat
VEN	Ventilator / Ventilation
Ventil	Ventilation
VSK	Bypass damper



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