



Installation instructions

Heat pump manager **HPC 301**

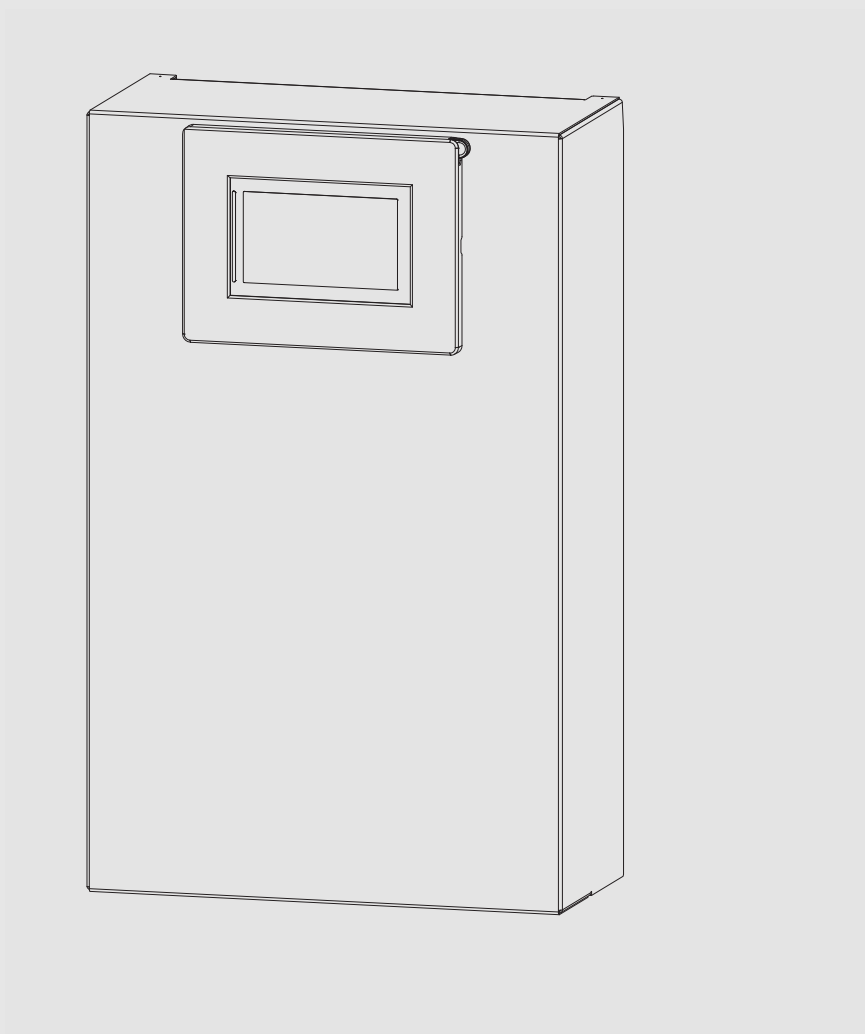


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1 Explanation of symbols and safety instructions

1.1 Explanation of symbols

Warnings

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing danger are not taken.

The following signal words are defined and can be used in this document:

 **DANGER**

DANGER indicates that severe to life-threatening personal injury will occur.

 **WARNING**

WARNING indicates a hazardous situation which, if not avoided, could result in serious personal injury or danger to life.

 **CAUTION**

CAUTION indicates a hazardous situation which, if not avoided, could result in minor to moderate personal injury.

NOTICE

ATTENTION indicates that material damage may occur.

Important information



The info symbol indicates important information where there is no risk to people or property.

1.2 General safety instructions

 Notices for the target group

When commissioning the unit, observe the following regulations and safety instructions:

- country-specific and relevant VDE safety regulations, in particular VDE 0100
- technical connection requirements of the power supply companies (EVU) and the supply network operators

NOTICE

Improper use.

Defect of the heat pump manager.

- ▶ Operate the heat pump manager only in dry rooms with temperatures between 0 °C and 35 °C.
- ▶ Condensation is not permitted.

NOTICE

Sensor connection cables routed incorrectly.

Heat pump manager defective.

- ▶ Extend sensor connection cables with a conductor cross-section of 0.75 mm² to a maximum of 40 m.
- ▶ Do not route sensor cables together with live cables.

NOTICE

Improper use.

Frost protection function defective.

- Do not switch off the power supply to the heat pump manager. Water must flow through the heat pump.

NOTICE

Improper wiring.

Heat pump manager defective.

Low voltage is present at the adapter boards -N1/SL, -N1/ML, -N17/LV and the connectors -N1/J9 ... J14 and J29 and -N17/J6 and J9.

- ▶ Do not connect mains voltage to the specified terminals.
- ▶ Observe the wiring instructions.



The switching contacts of the output relays are interference-free. Therefore, depending on the internal resistance of a measuring instrument, a voltage is measured even when the contacts are not closed; however, this voltage is well below the mains voltage.

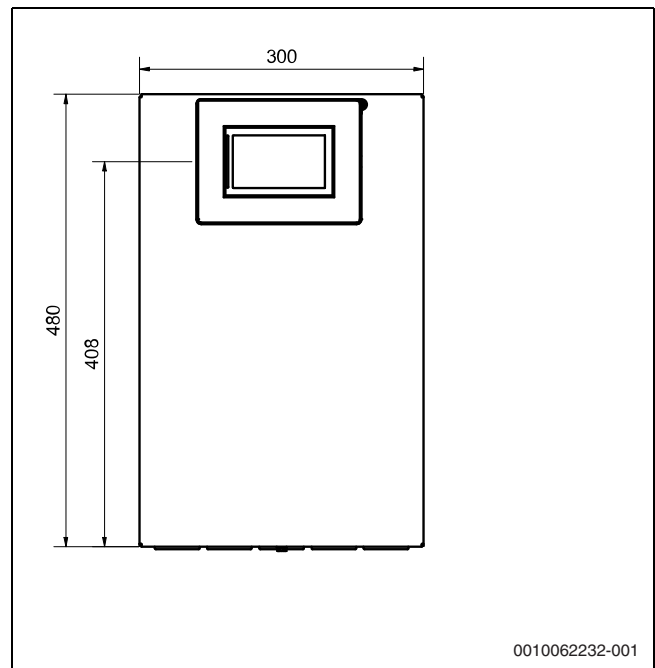


Fig. 2 Front view (mm)

2 Product Information

2.1 Scope of delivery

The heat pump manager is supplied for wall-mounted installation for a heat pump heating system.

Heat pump manager for wall-mounted installation

- Heat pump manager with enclosure
- Outside temperature sensor R1
- Demand sensor R2.2
- Touch screen
- Installation instructions for the specialist
- Operating instructions for users and the specialist

For wall-mounted installation:

- 3 wall plugs (6 mm) with screws

2.2 Product dimensions and minimum clearances

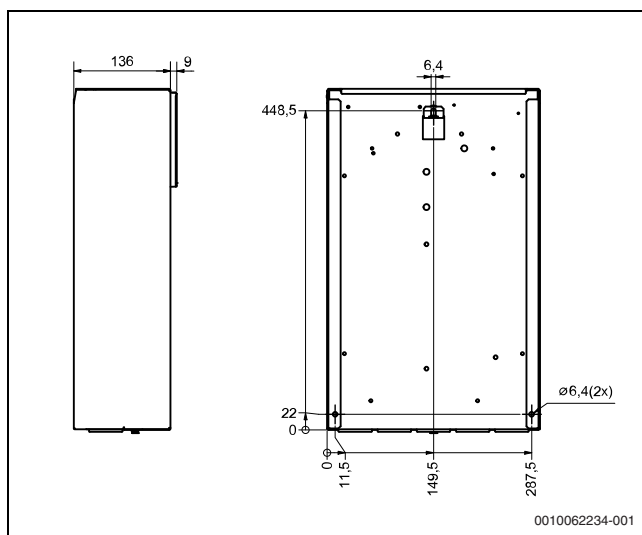


Fig. 1 Side view (mm)

Technical unit information

Mains voltage	230 V AC 50 Hz
Voltage range	195 to 253 V AC
Power consumption	50 VA
Fuse protection/RCD type	C13 A/Type A
Breaking capacity	≥ 1.5 kA
Switching capacity of the outputs	min. 2 A; cos (φ) = 0.6
LRA of the outputs	12 A at 230 V
IP rating according to EN 60529	IP 20
Operating temperature	0 °C to +35 °C
Storage temperature	-15 °C to +60 °C
Weight including packaging	12.6 kg
Weight excluding packaging	9.5 kg
Efficiency according to EN 60730-1	Type 1.C
Pollution degree according to IEC 60664-1	2
Heat/fire resistance according to EN 60335	Category D
Ball pressure test temperature in accordance with EN 60695-10-2	125 °C

Table 1 Technical data

3 Assembly

3.1 Heat pump manager installing on the wall

- ▶ Open the cover of the HPC 301.
- ▶ Insert a wall plug for the upper fixing eyelet at operating height.
- ▶ Screw the screw into the wall plug far enough so that the HPC 301 can still be attached.
- ▶ Mark the position of the fixing holes on the side.
- ▶ Unhook the controller again.
- ▶ Insert wall plugs for the fixing holes on the side.
- ▶ Hook in the HPC 301 and screw it tight.

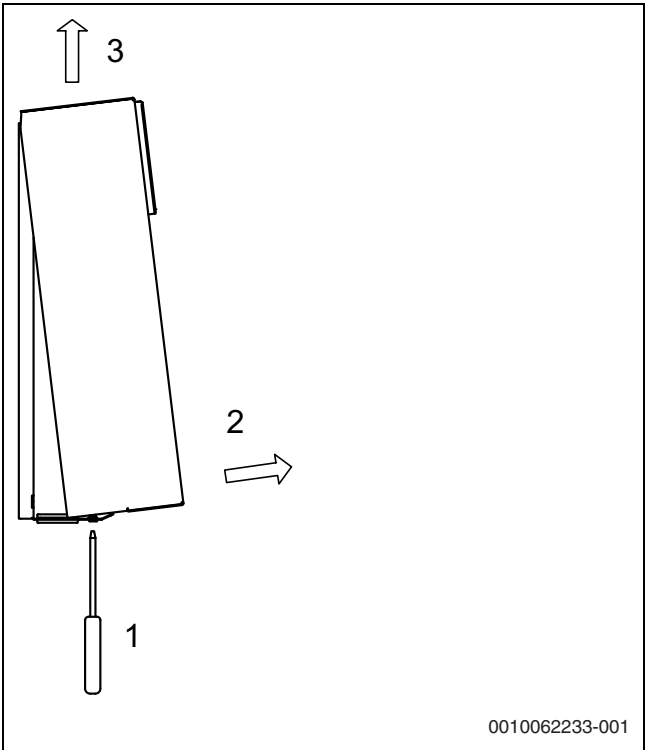


Fig. 3 Wall-mounted installation

3.2 Fitting temperature sensors

The following temperature sensors must also be fitted:

- Outdoor temperature sensor (R1) type NTC-2
- Temperature sensors (R35, R5 and R21) type NTC-10 for heating circuits 1, 2 and 3 (→ Table 4, page 8)
- Demand sensor (R2.2) type NTC-10
- DHW temperature sensor (R3) type NTC-10
- Temperature sensor for regenerative storage tank (R13) type NTC-10

3.2.1 Sensor curve

Temperature in °C	NTC-2 in k Ω	NTC-10 in k Ω
-20	14.6	67.7
-15	11.4	53.4
-10	8.9	42.3
-5	7.1	33.9
0	5.6	27.3
5	4.5	22.1
10	3.7	18.0
15	2.9	14.9
20	2.4	12.1
25	2.0	10.0
30	1.7	8.4
35	1.4	7.0
40	1.1	5.9
45	1.0	5.0
50	0.8	4.2
55	0.7	3.6
60	0.6	3.1

Table 2 Sensor curve



The temperature sensors must comply with sensor curve NTC-10. The exception is the outdoor temperature sensor (NTC-2) in the scope of delivery of the heat pump.

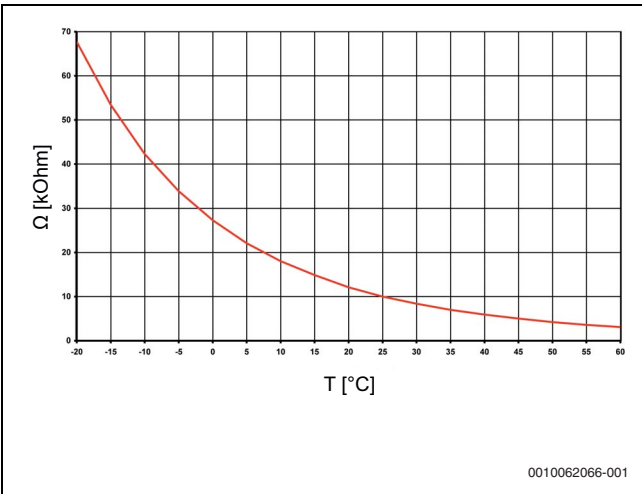


Fig. 4 Sensor curve NTC-10

T Outdoor temperature
Ω Resistance value

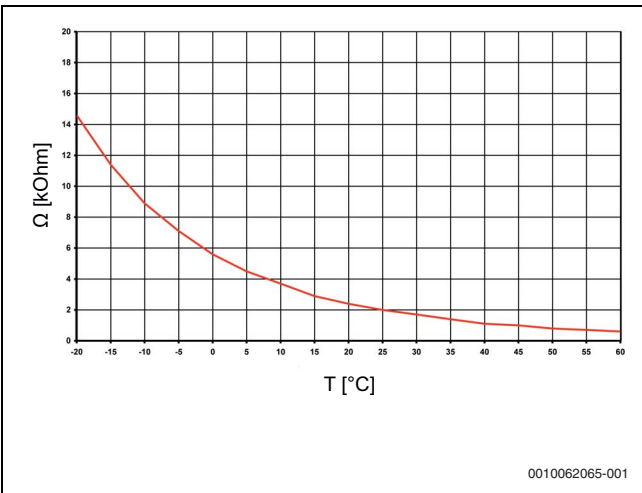


Fig. 5 Sensor curve NTC-2

T Outdoor temperature
Ω Resistance value

3.2.2 Fitting the outside temperature sensor



The temperature sensor must be installed in such a manner that all weather conditions are recorded and the measured value is not distorted.

- ▶ Install the temperature sensor on the external wall, preferably on the north or north-west side.
- ▶ Do not install the temperature sensor in a sheltered location (e.g. in a wall recess or under a balcony).
- ▶ Do not install the temperature sensor near windows, doors, extract air aperture, outdoor lights or heat pumps.
- ▶ Do not expose the temperature sensor to direct solar irradiation at any time of year.

Design parameters for sensor cable	
Cable material	Cu
Cable length	50 m
Ambient temperature	35 °C
Laying method	B2 (DIN VDE 0298-4 / IEC 60364-5-52)
Outer diameter	4-8 mm

Table 3 Design parameters

3.2.3 Mounting the contact sensor



The contact sensors only need to be fitted if they are included with the heat pump but have not been installed.

The contact sensors can be fitted as pipe-contact sensors or inserted into the sensor pocket of the compact manifold.

Fitting as pipe-contact sensors:

- ▶ Clean the heating pipe of paint, rust and scale.
- ▶ Apply a (thin) layer of heat conducting paste to the cleaned surface.
- ▶ Secure the sensor with a hose clip.

NOTICE

Malfunction due to loose sensor.

Malfunction of the pipe contact sensors

- ▶ Tighten the hose clip securely.

- ▶ Thermally insulate the sensor.

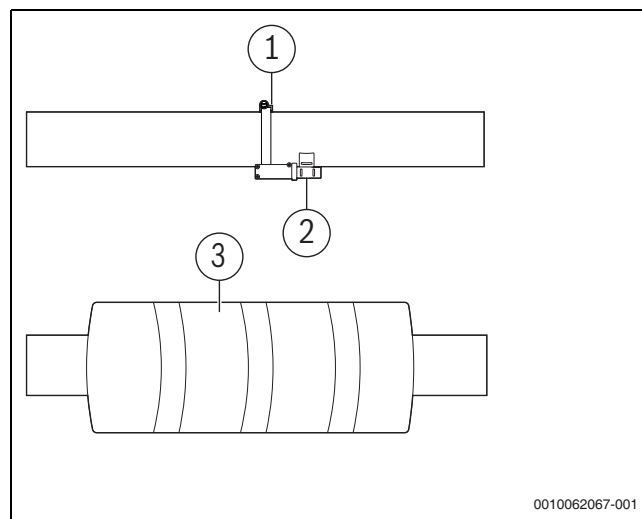


Fig. 6 Install the pipe contact sensors

- [1] Ring clamp
- [2] Contact sensor
- [3] Thermal insulation

4 Electrical connection

4.1 Electrical power connection work

The 5-wire power supply cable for the power element of the heat pump runs from the power meter of the heat pump through the isolating contactor (if required) of the power supply company into the heat pump (for load voltage, see the heat pump instructions). The power supply for the heat pump must include an all-pole disconnection with a contact gap of at least 3 mm (e.g. isolating contactor of the power supply company, power contactor), as well as an all-pole circuit breaker with simultaneous tripping of all power conductors (tripping current and characteristics according to the unit information).

The 3-wire power supply cable for the heat pump manager (N1) is routed to the future installation location of the heat pump manager (HPC 301). The supply cable (L/N/PE ~230 V, 50 Hz) for the HPC 301 must be connected to a continuous voltage supply and must therefore be tapped before the isolating contactor of the power supply company or connected to the domestic mains supply, as otherwise important protective functions will be out of operation during the blocking of the power supply company. The 230 V supply cable for the heat pump must be connected via terminal -N1/X2 of the heat pump manager.

The power supply company isolating contactor (K22) with 3 main contacts (1/3/5 / 2/4/6) and one auxiliary contact (normally open NO, e.g. 13/14) must be dimensioned according to the heat pump capacity and provided by the customer. The normally open contact of the power supply company isolating contactor (13/14) is connected to plug (1) (=DI1) of function block 0 (grey). **CAUTION?** Low voltage!

In a single energy source system (2nd heat generator), the immersion heater (E10) should be selected via a contactor (K20) according to the radiator output, and set on site. Control (230 V AC) is carried out by the heat pump manager via plug (7) (=NO3) connected to terminal block 0 (grey).

The flange heater (E9) in the DHW cylinder should be designed via a contactor (K21) according to the radiator output, and set on site. Control (230 V AC) is provided from the HPC 301 via connector (7) from the defined function block.

All power cables must be routed and fused in accordance with DIN VDE 0100.

The heating pump (M13) is connected to plug (5) (230 V AC) and (8) (control signal) of function block 0 (grey).

The primary pump (M16) is either connected to plugs (13) (230 V AC) and (14) (control signal) of function block 0 (grey) or connected via the heat pump.

The outside temperature sensor (R1) is connected to plug (3) (=U1) of function block 0 (grey).



When using 3-phase pumps, a power contactor may be required. This can be controlled using the 230 V output signal from the heat pump manager.



Sensor cables can be extended by up to 50 m using 2 × 0.75 mm cables.



Further information on wiring the heat pump manager can be found in the electrical documentation.

NOTICE

The communication cable is essential for the operation of outdoor air-to-water heat pumps.

- ▶ The data cable must be shielded.
- ▶ The data cable must be routed separately from the load cable.
- ▶ Connect the data cable to N1-J9.
- ▶ For further information, refer to the electrical documentation.

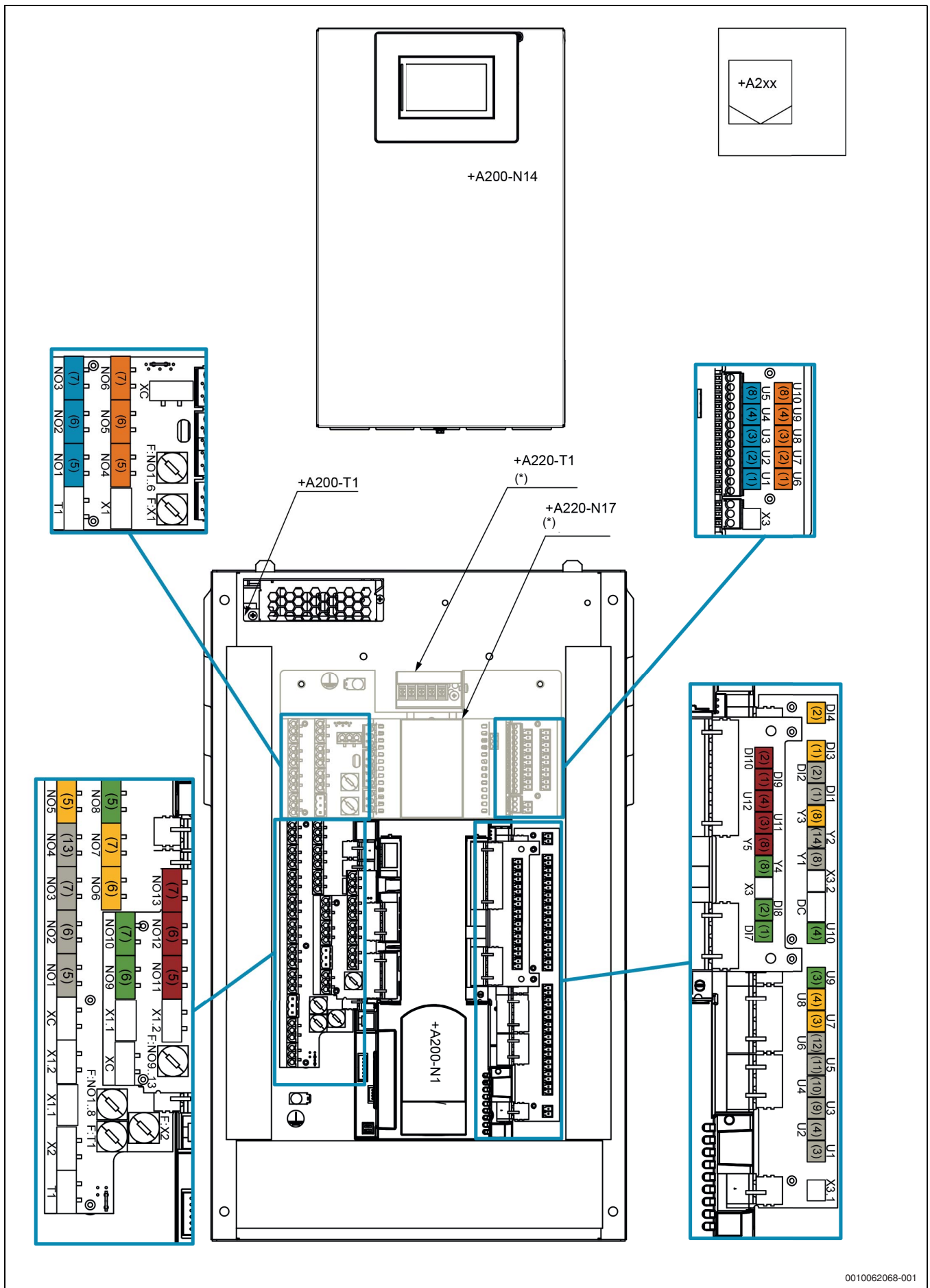


CAUTION

Do not reverse the load voltage and control cables.

Risk of electric shock.

- ▶ When installing the electrical components, ensure the correct connection is made in accordance with the electric circuit diagram.



0010062068-001

Fig. 7 Wiring Diagram

* optional

4.2 Electrical power connection work

As standard equipment, the heat pump manager HPC 301 is equipped with a "General/1st unmixed circuit" function which is permanently assigned to the "grey" function block. Additional functions can be individually assigned to the three function blocks (yellow, green, red) (→Chapter 4.2.1, page 8).

If these three function blocks are not sufficient, it is possible to add two further function blocks (orange, blue) using the FEM2 extension, available as an optional accessory. A maximum of five function blocks is possible (yellow, green, red, orange, blue).

4.2.1 Overview of functions

General/1st Circuit: Unmixed/Direct +A400	
A1/K22	Power supply company inhibiting input
A2/K23	External inhibiting input
R1	Outside temperature sensor
R2.2	Demand sensor
M13	Heating circulation pump
H5	Remote fault display
E10.1/K20	Pipe heating/immersion heater
N27.1	Smart grid green
N27.2	Smart grid red
N28	Building management system 0-10 V setpoint value
M16	Auxiliary circulation pump
AO M16	Auxiliary circulation pump control signal
DHW +A420	
K31	Circulation demand
B8	Thermostat
R3	Hot water sensor
(Y)M18	Heat pump/diverter valve
E9/K21	Flange heater
AO M18	Heat pump control signal
1st mixed circuit +A411	
R35	Sensors
M13	Heating pump
M21 ↑	Mixer open
M21 ↓	Mixer closed
2nd mixed circuit +A412	
R5	Sensors
M15	Heating pump
M22 ↑	Mixer open
M22 ↓	Mixer closed
3rd mixed circuit +A413	
R21	Sensors
M20	Heating pump
M29 ↑	Mixer open
M29 ↓	Mixer closed
Bivalent +A441	
E10.2/3	Oil/gas boiler
AO E10.2/3	Oil/gas boiler control signal
M26 ↑	Mixer open
M26 ↓	Mixer closed
Regenerative +A442	
R13	Sensors
M28	Heating pump

M27 ↑	Mixer open
M27 ↓	Mixer closed
Swimming pool +A430	
B4	Thermostat
R20	Hot water sensor
(Y)M19	Heat pump/diverter valve
K36	Flange heater
AO M19	Heat pump control signal
Cooling active +A451	
N5	Dew point guard
K28	Heating/cooling changeover
R24.2	Return sensor primary circuit cooling
R39	Demand sensor cooling
N9/M17	Room thermostat/cooling pump changeover

Table 4 Functions

4.2.2 Pin assignment overview

	Pin number													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Funktion block 0 (grey)	DI1	DI2	U1	(U2)	NO1	NO2	NO3	Y1	U3	U4	U5	U6	NO4	Y2
Function														
General/ 1st unmixed circuit/ direct circuit	A1 K22	A2 K23	R1	R2.2	M13	H5	E10.1 K20	–	N27.1	N27.2	N28	–	M16	A0 M16

Table 5 Function block permanent

	Pin number							
	1	2	3	4	5	6	7	8
Function block I (yellow)	(DI3)	(DI4)	(U7)	(U8)	(NO5)	(NO6)	(NO7)	(Y3)
Function block II (green)	(DI7)	(DI8)	(U9)	(U10)	(NO8)	(NO9)	(NO10)	(Y4)
Function block III (red)	(DI9)	(DI10)	(U11)	(U12)	(NO11)	(NO12)	(NO13)	(Y5)
Function block IV (blue) (FEM2 accessory)	(U1)	(U2)	(U3)	(U4)	(NO1)	(NO2)	(NO3)	(U5)
Function block V (orange) (FEM2 accessory)	(U6)	(U7)	(U8)	(U9)	(NO4)	(NO5)	(NO6)	(U10)
Function								
DHW	K31	B3	R3	–	Y/M18	M24	E9/K21	A0 M18
1st mixed circuit	–	–	R35	–	M13	M21 ↑	M21 ↓	–
2nd mixed circuit	–	–	R5	–	M15	M22 ↑	M22 ↓	–
3rd mixed circuit	–	–	R21	–	M20	M29 ↑	M29 ↓	–
Dual mode	–	–	–	–	E10.2/3	M26 ↑	M26 ↓	A0 E10.2/3
Regenerative	–	–	R13	–	M28	M27 ↑	M27 ↓	–
Swim. pool	–	B4	R20	–	M19	–	K36	A0 M19
Cooling active	N5	K28	R24.2	R39	N9/M17	–	–	–

Table 6 Function block flexible

Example

Selecting the pin assignment for the DHW function on the yellow function block.

First, select the function to be used – in this case, DHW – and the function block to be assigned a colour – in this case, yellow (Function Block I).

Now, in the table, select the component to be connected in the DHW row – for example, DHW temperature sensor R3.

In the 1st row, select the connector on the yellow function block to which the component is to be connected. In this case, the hot water sensor R3 must be connected to the yellow connector with the number 3 and the number U7.

This procedure must be followed for every component to be connected.



When commissioning the system via the control unit, the function to be used is queried and set with the corresponding colour assignment.



The detailed electrical documentation can be found enclosed in the package.



Additional data and control voltage cables must be routed between the wall-mounted master controller and the heat pump manager.

4.3 Connection of electronically controlled heating pumps

Electronically controlled heating pumps can have high starting currents, which may reduce the service life of the heat pump manager system. If the starting current is high or unknown, a coupling relay must be installed. The coupling relay must be provided by the customer. This is not necessary if the electronically controlled circulation pump does not exceed the maximum permissible operating current of the heat pump manager (→ as specified in the electrical documentation) or if approval is available from the pump manufacturer.



The high-efficiency pumps (UPH) are supplied with a suitable coupling relay for connecting and operating the electronically controlled circulation pump.

NOTICE

Incorrect connection at the relay output.

- Only switch one electronically controlled circulation pump per relay output.

5 Additional accessories

5.1 RTM Econ temperature controller

When cooling via area heating/area cooling systems, control is carried out according to the room temperature and humidity measured by the room controllers.

The minimum possible cooling water temperature is calculated from the measured room temperature and humidity of the reference room. The control behaviour of the cooling system is influenced by the currently measured room temperature and the set room temperature set.

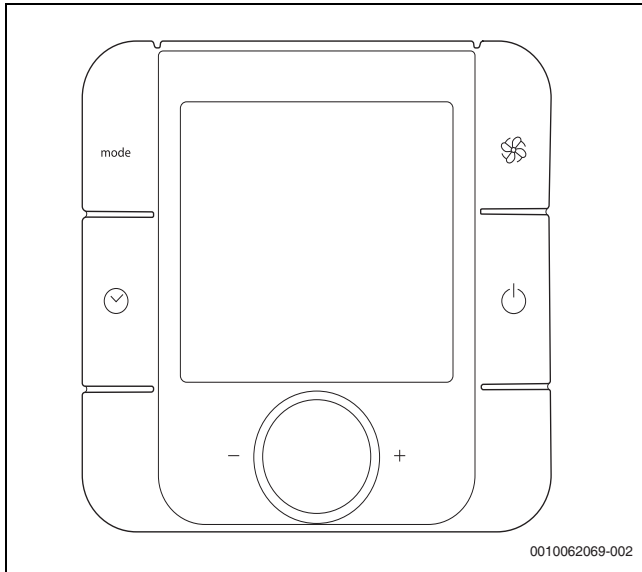


Fig. 8 Room thermostats

5.2 Building services management system

The heat pump manager can be connected to a Modbus RTU building management system via the integrated interface plug-in card. By replacing this interface card with a KNX interface card (available as an accessory), these networks can also be accessed.

For the exact connection and configuration of the interfaces, please refer to the supplementary installation instructions for the interface cards.

The following protocols are available:

- Modbus RTU
- KNX

Installation instructions of the interface boards can be found here:





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