

– weishaupt –

# manual

Installation and operating instructions

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## 1 Safety notes

### 1 Safety notes

#### 1.1 Symbols and markings

Particularly important information in these instructions is marked with CAUTION! or NOTE.

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#### CAUTION

Immediate danger to life or danger of severe personal injury or significant damage to property.

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#### Note

Risk of damage to property or minor personal injury or important information with no further risk of personal injury or damage to property.

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#### 1.2 Important information

- During commissioning, observe the respective country-specific regulations and the applicable VDE safety regulations, particularly VDE 0100 as well as the technical connection requirements of the utility companies (EVU) and network operators!
- The cascade controller may only be operated in dry rooms with temperatures between 0°C and 35°C. Condensation is not permitted.
- All sensor connection lines can be extended to up to 50 m with PVC Cu cables with routing type B2 and an ambient temperature of 35°C. Sensor leads should not be installed next to power cables.
- To ensure that the frost protection function works properly, the cascade controller must remain connected to the power supply and the flow must be maintained through the heat pumps at all times.
- The switching contacts of the output relay are interference-suppressed. Therefore, depending on the internal resistance of the measuring instrument, a voltage can also be measured when the contacts are open. However, this will be much lower than the line voltage.
- The adapter boards -N1/SL, -N1/ML, -N17/LV and the connectors -N1/J9, J14 and J29 and -N17/J6 and J9 carry extra-low voltage. If, due to a wiring error, line voltage is mistakenly connected to these terminals, the cascade controller will be destroyed.

## 2 Cascade controller scope of supply

### **2 Cascade controller scope of supply**

- Cascade controller with casing
- 3 wall plugs (6 mm) with screws for wall mounting
- Demand sensor R2.2
- Flow sensor R9.5
- Return sensor R2.5

#### **Note**

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Outside temperature sensor R1 not included. An outside temperature sensor for the cascade controller should be retrieved from the scope of supply of the heat pump being installed.

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### 3 Mounting

#### 3.1 Attaching the wall-mounted cascade controller

The controller is attached to the wall with the 3 screws and wall plugs (6 mm) included in the scope of supply. The following installation procedure must be followed to avoid soiling or damaging the controller:

- Mount the wall plugs for the upper fastening eyelet at operator level.
- Screw the screw into the wall plug so that the controller can be mounted.
- Mount the controller by the upper fastening eyelet.
- Mark the position of the side drill-holes.
- Unhook the controller.
- Mount the wall plugs for the side drill-holes.
- Remount the controller at the top and tighten the screws.

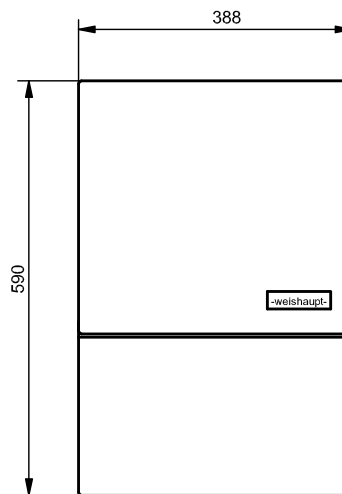


Fig. 3.1: Dimensions of the wall-mounted cascade controller

3 Mounting

**3.2 Temperature sensor**

Depending on the hydraulics' layout, the following temperature sensors are already installed or must be additionally mounted:

NTC-2 sensor

- Outside temperature (R1)

NTC-10 sensor

- 1st, 2nd and 3rd heating circuit temperature sensor (R35, R5 and R21)
- Demand sensor (R2.2)
- DHW temperature sensor (R3)
- Renewable cylinder temperature sensor (R13)
- Flow sensor (R9.5)
- Return sensor (R2.5)

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

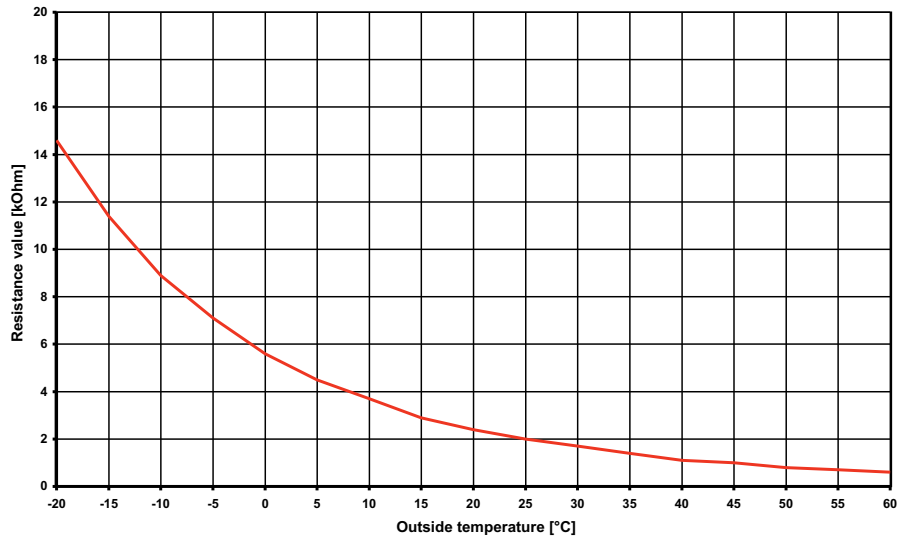


Fig. 3.2: Sensor characteristic curve, NTC-2 according to DIN 44574

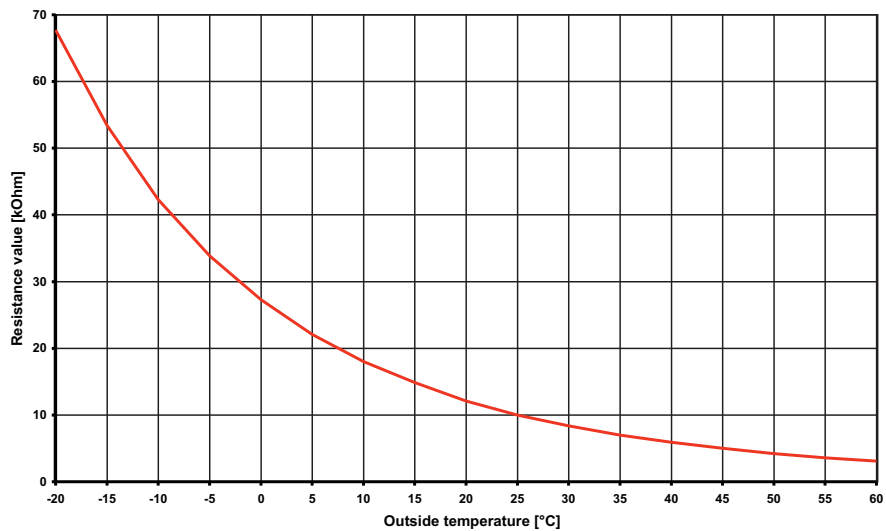


Fig. 3.3: NTC-10 sensor characteristic curve for connection to the heating controller

3 Mounting

**3.2.1 Mounting the outside temperature sensor**

The temperature sensor must be mounted in such a way that all weather conditions are taken into consideration and the measured value is not falsified.

- On the external wall of a heated room used as living space, if possible on the north or north-west side of the building
- Do not install in a "sheltered position" (e.g. in a wall niche or under a balcony)
- Not in the vicinity of windows, doors, exhaust air vents, external lighting or heat pumps
- Not to be exposed to direct sunlight at any time of year

**⚠ Note**

Outside temperature sensor R1 not included. An outside temperature sensor for the cascade controller should be retrieved from the scope of supply of the heat pump being installed.

**⚠ Note**

A cascade circuit with multiple heat pumps and a single cascade controller requires only a single outside temperature sensor for the cascade controller. The cascade controller will transmit the outside temperature to the heat pumps' heat pump managers through the communications connection.

**Dimensioning parameters, sensor cable**

Conductor material	Cu
Cable length	50 m
Ambient temperature	35°C
Routing type	B2 (DIN VDE 0298-4/ IEC 60364-5-52)
External diameter	4-8 mm

**3.2.2 Mounting the strap-on sensor**

The strap-on sensors can be fitted as pipe-mounted sensors or installed in the immersion sleeve of the compact manifold.

- Remove paint, rust and scale from heating pipe
- Coat the cleaned surface with heat transfer compound (apply sparingly)
- Attach the sensor with a hose clip (tighten firmly, as loose sensors can cause malfunctions) and thermally insulate

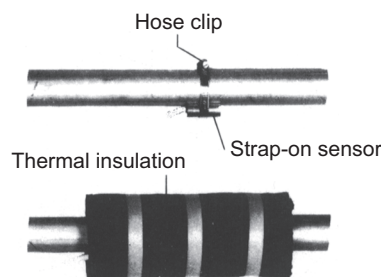


Fig. 3.4: Mounting a pipe strap-on sensor

### 3 Mounting

#### 3.2.3 Hydraulic distribution system

The compact manifold and the dual differential pressureless manifold function as an interface between the heat pump, the heating distribution system, the buffer tank and, in some cases, even the domestic hot water cylinder. A compact system is used to simplify the installation process, so that a lot of different components do not have to be installed individually. Further information can be found in the relevant installation instructions.

##### **Compact manifold**

If a compact manifold is used, the demand sensor is mounted on the joint return as a strap-on sensor or in an immersion sleeve.

##### **Dual differential pressureless manifold**

In order for the heating circuit pumps of the generator and consumer circuits to supply the flow to the demand sensor R2.2, the demand sensor must be installed in the immersion sleeve of the dual differential pressureless manifold. The return sensor remains in the heat pump.

##### **Note**

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Through installation of the demand sensor R2.2 as a strap-on sensor at the water outlet of the buffer tank connected in series, operation of the heating system can be optimised.

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## 4 Electrical installation work for the cascade controller

### 4.1 Electrical installation work

1. A shielded communications line (e.g. Y(ST)Y ..LG) needs to be set up between the cascade controller and the heat pump managers. For details, refer to the included electrical documentation.
2. The three-core electrical supply cable for the cascade controller (N1) is laid to the cascade controller's later installation location.  
The supply cable (L/N/PE~230 V, 50 Hz) for the cascade controller must have a continuous voltage. For this reason, it should be tapped upstream from the utility company blocking contactor or be connected to the household current, because otherwise important protection functions could be lost during a utility block.
3. The NO contact for the utility company blocking contactor (13/14) is connected to pin (1) (*D11*) of function block 0 (grey). CAUTION! Extra-low voltage!
4. The contactor (K20) for the immersion heater (E10) of mono energy systems (2nd heat generator) should be dimensioned according to the radiator output and must be provided on-site. Control (230 V AC) is executed through the cascade controller via connection to pin (7) (*NO3*) of function block 0 (grey).
5. The contactor (K21) for the flange heater (E9) in the domestic hot water cylinder should be dimensioned according to the radiator output and must be provided on-site. The control (230 V AC) is performed from the WPM via pin (7) of the defined function block.
6. The contactors mentioned above in points 3, 4 and 5 are installed in the electrical distribution system. The mains cables for the radiators should be dimensioned and protected according to DIN VDE 0100.
7. The heat circulating pump (M13) is connected to pin (5) (230 V AC) and (8) (control signal) of function block 0 (grey).
8. The external sensor (R1) is connected to pin (3) (*U1*) of function block 0 (grey).

#### Note

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When using three-phase pumps, a power contactor can be controlled via the 230 V output signal of the cascade controller.  
Sensor cables can be extended up to 50 m with 2 x 0.75 mm cables.

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#### Note

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Further information on wiring the cascade controller is available in the circuit diagram.

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4 Electrical installation work for the cascade controller

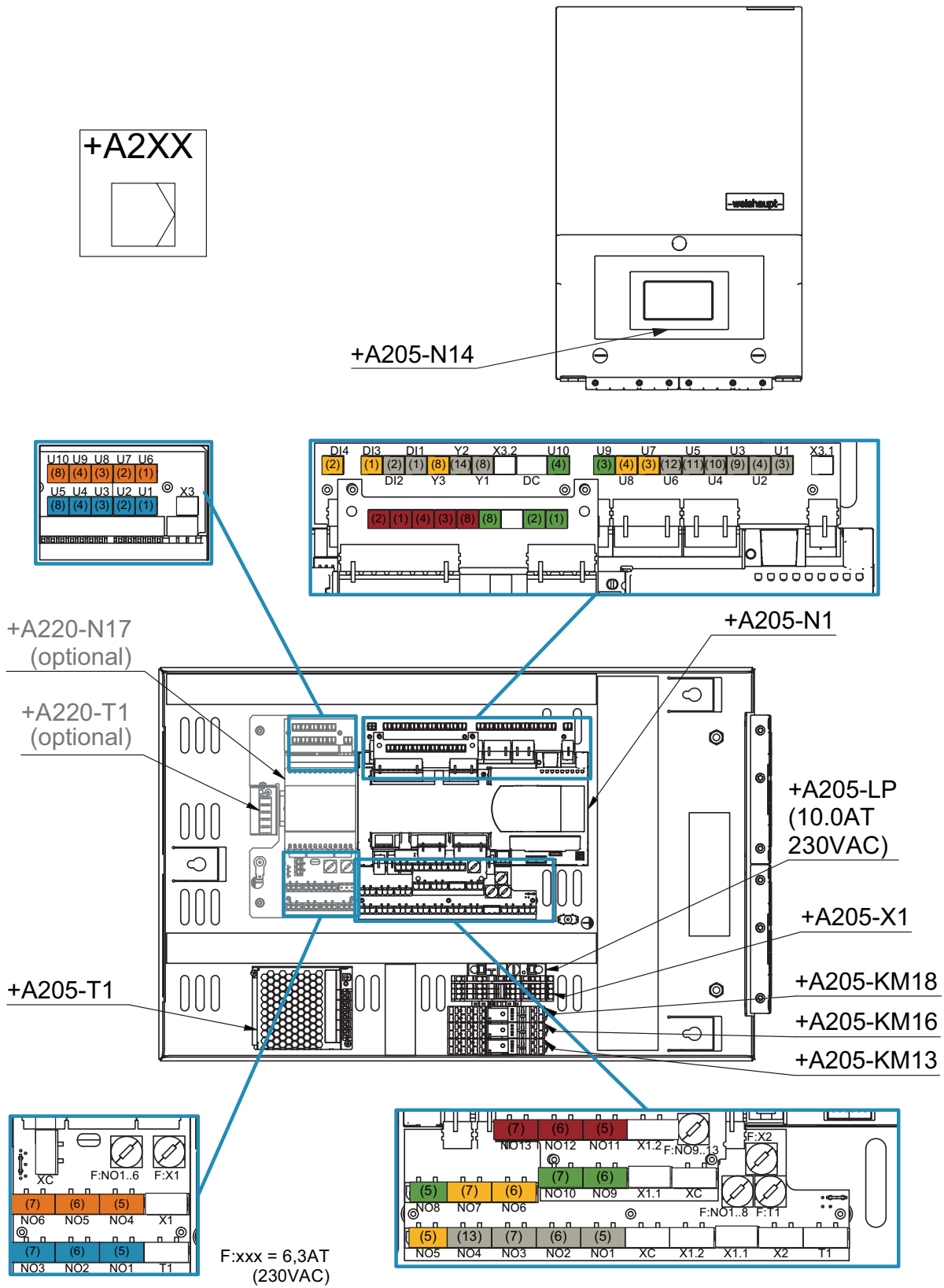


Fig. 4.1: Wall-mounted cascade controller

4 Electrical installation work for the cascade controller

**4.2 Functions**

In its basic version, the WPM 6.0 cascade controller comes with one unchangeable pin assignment on the “grey” function block for the function “General/unmixed circuit 1”. Additional functions can be assigned as desired to three function blocks (yellow, green, red) (see Chapter 4.2.1 on page 11).

If these three function blocks are not enough, you can add two more function blocks (orange, blue) using the extension optionally available as a special accessory. Five is the maximum possible number of function blocks (yellow, green, red, orange, blue).

**⚠ Note**

The “Active cooling” function can only be selected for reversible heat pumps. The “Active cooling” function only needs to be selected if it includes a required component.

**⚠ Note**

The “Master” function only needs to be selected if it includes a required component.

**4.2.1 Overview of functions**

<b>General / unmixed circuit 1 / direct circuit +A400</b>	
A1/K22	Utility company disable contactor
A2/K23	External disable contactor
R1	Outside temperature sensor
R2.2	Demand sensor
M13	Heat circulating pump
H5	Remote fault indicator
E10.1/K20	Pipe heater/immersion heater
N27.1	Smart Grid green
N27.2	Smart Grid red
N28	Building management system 0-10 V setpoint
M16	Auxiliary circulating pump
AO M16	Control signal for circulating pump
<b>Domestic hot water +A420</b>	
K31	Circulation system requirements
B3	Thermostat
R3	Domestic hot water sensor
(Y)M18	Circulating pump/reversing valve
E9/K21	Flange heater
M24	Circulation pump
AO M18	Control signal for circulating pump
<b>Mixed circuit 1 +A411</b>	
R35	Sensor
M13	Circulating pump
M21↑	Mixer open
M21↓	Mixer closed
<b>Mixed circuit 2 +A412</b>	
R5	Sensor
M15	Circulating pump
M22↑	Mixer open
M22↓	Mixer closed
<b>Mixed circuit 3 +A413</b>	
R21	Sensor
M20	Circulating pump
M29↑	Mixer open
M29↓	Mixer closed

4 Electrical installation work for the cascade controller

<b>Bivalent +A441</b>	
E10.2/3	Oil/gas boiler
M26↑	Mixer open
M26↓	Mixer closed
AO E10.2/3	Oil/gas boiler control signal
<b>Renewable +A442</b>	
R13	Sensor
M28	Circulating pump
M27↑	Mixer open
M27↓	Mixer closed
<b>Swimming pool +A430</b>	
B4	Thermostat
R20	Swimming pool sensor
(Y)M19	Circulating pump/reversing valve
K36	Flange heater
AO M19	Control signal for circulating pump
<b>Active cooling +A451</b>	
N5	Dew point monitor
K28	Switching, heating/cooling
R24.2	Return sensor, primary circuit, cooling
R39	Demand sensor, cooling
N9/M17	Switching, room thermostat/cooling circulating pump
Y12↑	External 4-way reversing valve open
Y12↓	External 4-way reversing valve closed
<b>Passive cooling +A452</b>	
N5	Dew point monitor
K28	Switching, heating/cooling
R11	Flow, cooling water
R4	Return, cooling water
M12	Primary circulating pump, passive cooling
Y5/Y6	3- or 2-way valve
M17	Cooling circulating pump
<b>Master +A500</b>	
R2.5	Return sensor
R9.5	Flow sensor

4.2.2 List of pin assignments for function block, fixed

	Connector number													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Function block 0	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
Function														
General/unmixed circuit 1 +A400	A1 K22	A2 K23	R1	R2.2	M13	H5	E10.2 K20	-	N27.1	N27.2	N28	-	M16	AO M16

4 Electrical installation work for the cascade controller

4.2.3 List of pin assignments for function block, flexible

	Connector number							
	1	2	3	4	5	6	7	8
Function block I	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Function block II	Green	Green	Green	Green	Green	Green	Green	Green
Function block III	Red	Red	Red	Red	Red	Red	Red	Red
Function block IV (accessories)	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Function block V (accessories)	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Functions								
Domestic hot water +A420	K31	B3	R3	-	(Y)M18	M24	E9/K21	AO M18
Mixed circuit 1 +A411	-	-	R35	-	M13	M21↑	M21↓	-
Mixed circuit 2 +A412	-	-	R5	-	M15	M22↑	M22↓	-
Mixed circuit 3 +A413	-	-	R21	-	M20	M29↑	M29↓	-
Bivalent +A441	-	-	-	-	E10.2/3	M26↑	M26↓	AO E10.2/3
Renewable +A442	-	-	R13	-	M28	M27↑	M27↓	-
Swimming pool +A430	-	B4	R20	-	M19	-	K36	AOM19
Active cooling +A451	N5	K28	R24.2	R39	N9/M17	Y12↑	Y12↓	-
Passive cooling +A452	N5	K28	R11	R4	M12	Y5/Y6	M17	-
Master +A500			R2.5	R9.5				

**Example: Chosen pin assignment for domestic hot water function set to function block yellow**

First, choose the function for use, in this case domestic hot water, and the colour for the function block assigned, in this case yellow. Then find the domestic hot water line in the table and choose the component for connection, for example domestic hot water sensor R3. Afterwards, choose the pin for assignment on the yellow function block in the first line. In this case, domestic hot water sensor R3 needs to be connected to yellow pin number 3. Proceed likewise for all components you wish to connect.

**⚠ Note**

When commissioning the system through the touch display, the function for use and its associated colour assignment is queried and set.

	Connector number							
	1	2	3	4	5	6	7	8
Function block I	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Function block II	Green	Green	Green	Green	Green	Green	Green	Green
Function block III	Red	Red	Red	Red	Red	Red	Red	Red
Function block IV (accessories)	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Function block V (accessories)	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Functions								
Domestic hot water +A420	K31	B8	R3	-	(Y)M18	M24	E9/K21	AO M18
Mixed circuit 1 +A411	-	-	R35	-	M13	M21↑	M21↓	-

**⚠ Note**

You can find detailed circuit diagram in the accessories pack

**⚠ Note**

The wall-mounted cascade controller and the heat pump manager need to be connected to one another with communication and control voltage cables

## 4 Electrical installation work for the cascade controller

### 4.2.4 Master

The cascade controller can control the hydraulic integration of heat pump heating systems with serial or with parallel buffer tanks. In heat pump heating systems with parallel buffer tanks, positioning the shared return sensor (R2.5) for the “Master” function and the demand sensor (R2.2) on the parallel buffer tank’s flow outlet will ensure that the buffer tank discharges completely. Please observe the approved hydraulic integrations in this context.

### 4.3 Connecting electronically regulated circulating pumps

Electronically regulated circulating pumps may have high starting currents, which may reduce the service life of the cascade controller. If the starting current value is high, or is unknown, install a coupling relay – insofar as it is not already integrated. The coupling relay must usually be supplied on-site (not for M13, M16, M18). This is not necessary if the maximum permissible operating current of the cascade controller (see specifications in the circuit diagram) is not exceeded by the electronically regulated circulating pump or a relevant approval has been issued by the pump manufacturer.

**⚠ Note**

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The high-efficiency pumps (UPH) are supplied with the relevant coupling relay for connecting and operating the electronically regulated circulating pump.

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**⚠ CAUTION**

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It is not permitted to connect more than one electronically regulated circulating pump via a single relay output.

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## 5 Special accessories

### 5.1 Room temperature controller RTM Econ

With cooling using panel heating/cooling systems, regulation 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 room temperature and humidity measured in the reference room. The control response of the cooling system is influenced by the currently measured room temperature and the set room set temperature.



Fig. 5.1: Room temperature controller

### 5.2 Building management system

The cascade controller can be connected to a building management system network by adding the relevant extension interface. Observe the specifications detailing connection and parametrisation in the supplementary installation instructions of the extension interface.

The following network connections can be made on the cascade controller:

- EIB, KNX
- Ethernet
- Modbus TCP
- Modbus RTU

## 6 Technical device information

Nominal voltage	230 V AC 50 Hz
Voltage range	195 to 253 V AC
Power consumption	50 VA
Fusing / RCD type	C13A / A
Fuse breaking capacity	≤1.5 kA
Switching capacity of outputs	See circuit diagram (depending on the output)
Degree of protection according to EN 60529	IP 20
Operating temperature	0°C to +35°C
Storage temperature	-15 °C to +60 °C
Weight	12.6 kg with packaging 9.5 kg without packaging
Mode of action	Type 1.C
Degree of soiling	2
Heat/fire resistance	Category D
Temperature for ball pressure test	125 °C









Das ist Zuverlässigkeit. C'est la fiabilité. That's reliability. Questa è affidabilità. 信頼性とは、ころいろものです。Това е надеждност. Ez a megbízhatóság. Đó là sự đáng tin cậy. اردن رقابارت المؤمنان است To je zanesljivost. Güvence budur. Αυτό σημαίνει αξιοπιστία. 그것은 바로 신뢰성입니다. To je spoľahlivosť. Dat is betrouwbaarheid. Tämä on luotettavuutta. هذه هي الوثوقية See on usaldusväärsus. Pouzdana tvrtka. To jest niezawodność. นั่นคือความเชื่อถือได้ Це надійність. Isto é fiabilidade. To je spolehlivost. यही विश्वसनीयता है. Det är pålitlighet. זאת אמינות. Esto es fiabilidad. Это надёжность. Itulah kepercayaan. 值得信赖。Is é sin iontaofacht. Iyan ang maaasahan. Aceasta este fiabilitatea. اتى ن س و شو سه مو Tai - patikimumas. Det er pålitelighet. Tā ir uzticamība. Sa se fyab. To je pouzdanost. La fiabilité avant tout. Det er pålidelighed.