

– 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.

##### **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

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#### **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.

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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.

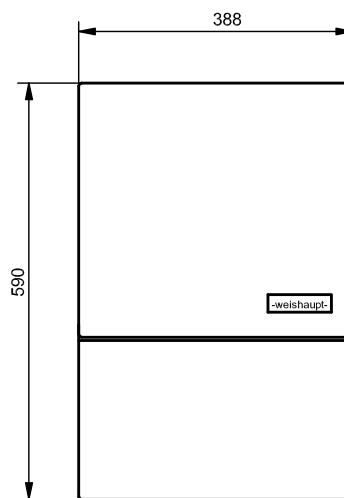


Fig. 3.1: Dimensions of the wall-mounted cascade controller

### 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 |

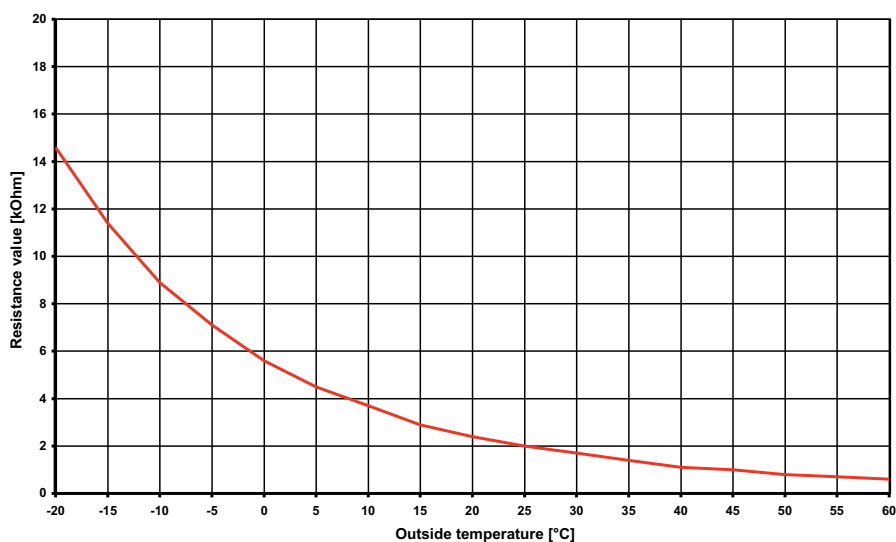


Fig. 3.2: Sensor characteristic curve, NTC-2 according to DIN 44574

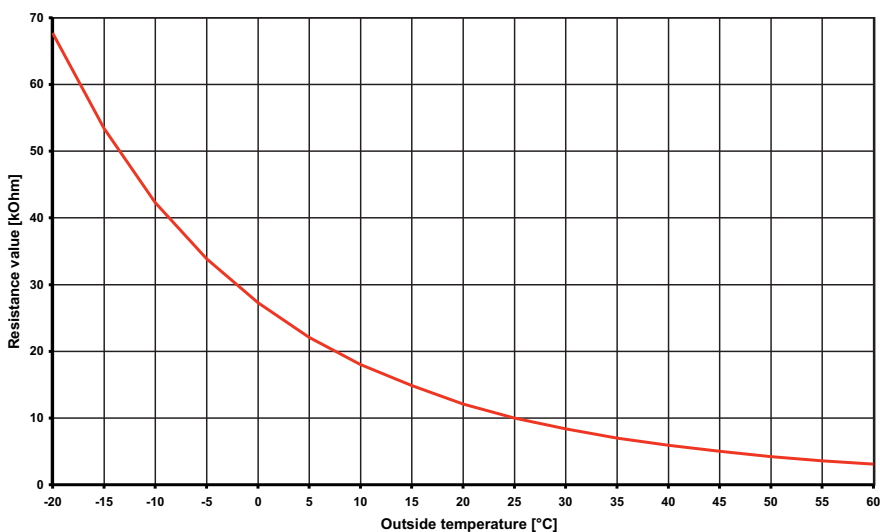


Fig. 3.3: NTC-10 sensor characteristic curve for connection to the heating controller

### 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/<br>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

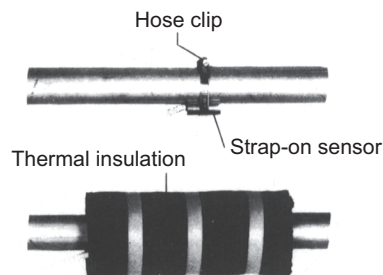


Fig. 3.4: Mounting a pipe strap-on sensor

### 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) (*D/I*) 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).

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#### Note

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

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

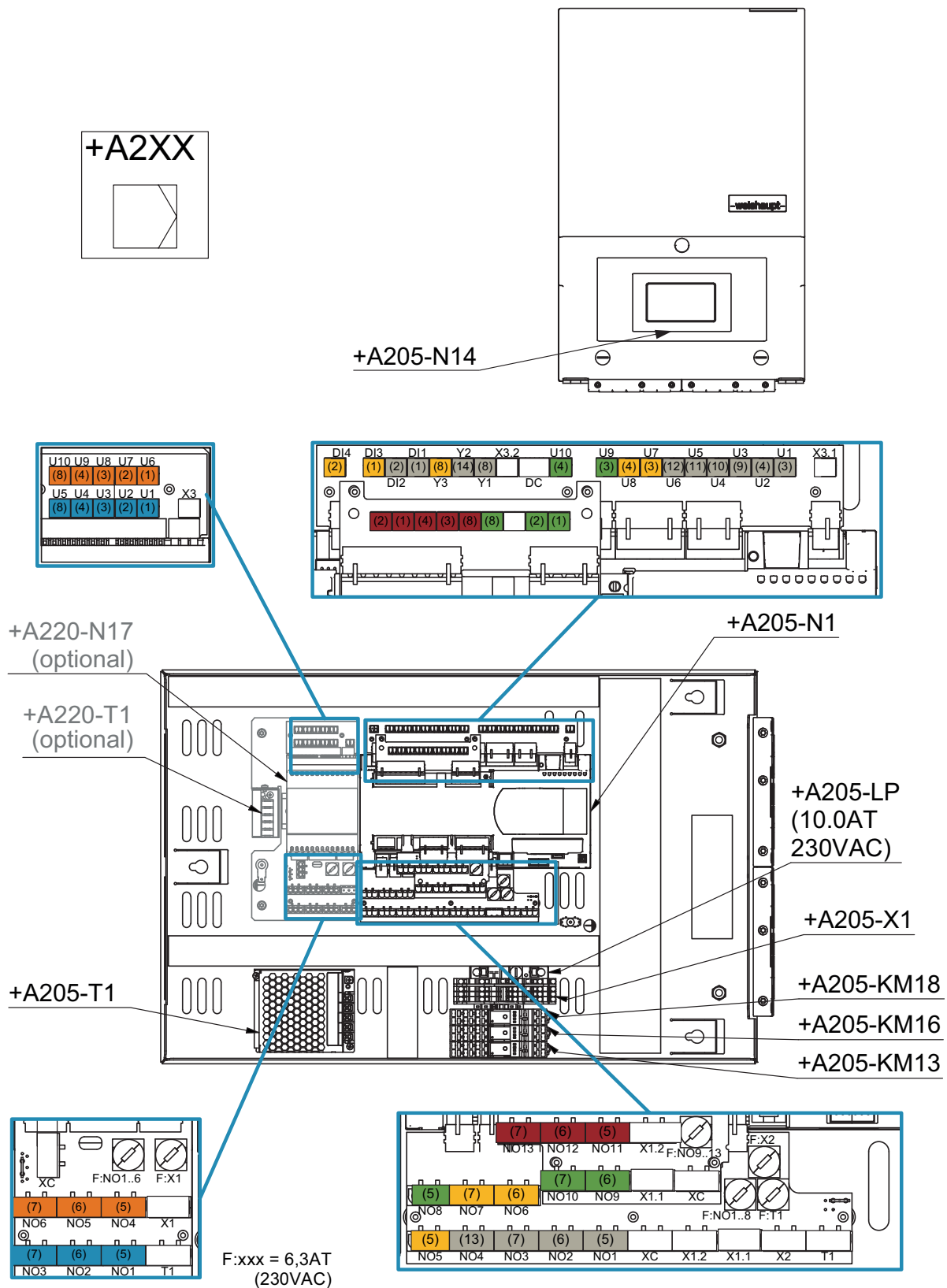


Fig. 4.1: Wall-mounted cascade controller

## 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

| General/unmixed circuit 1 +A400 |                                     |
|---------------------------------|-------------------------------------|
| 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                      |
| M16                             | Auxiliary circulating pump          |
| M16 AO                          | Control signal for circulating pump |
| Domestic hot water +A420        |                                     |
| K31                             | Circulation system requirements     |
| B3                              | Thermostat                          |
| R3                              | Domestic hot water sensor           |
| (Y)M18                          | Circulating pump/reversing valve    |
| E9/K21                          | Flange heater                       |
| M24                             | Circulation pump                    |
| M18 AO                          | Control signal for circulating pump |
| Mixed circuit 1 +A411           |                                     |
| R35                             | Sensor                              |
| M13                             | Circulating pump                    |
| M21↑                            | Mixer open                          |
| M21↓                            | Mixer closed                        |
| Mixed circuit 2 +A412           |                                     |
| R5                              | Sensor                              |
| M15                             | Circulating pump                    |
| M22↑                            | Mixer open                          |
| M22↓                            | Mixer closed                        |
| Mixed circuit 3 +A413           |                                     |
| 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                                        |
| <b>Renewable +A442</b>       |                                                     |
| R13                          | Sensor                                              |
| 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                                       |
| M19 AO                       | 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<br>K22        | A2<br>K23 | R1   | R2.2 | M13  | H5   | E10.2<br>K20 | -    | N27.1 | N27.2 | -    | -    | M16  | M16<br>AO |

### 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) | Orange           | Orange | Orange | Orange | Orange  | Orange | Orange | Orange |
| Function block V (accessories)  | Blue             | Blue   | Blue   | Blue   | Blue    | Blue   | Blue   | Blue   |
| Functions                       |                  |        |        |        |         |        |        |        |
| Domestic hot water +A420        | K31              | B3     | R3     | -      | (Y)M18  | M24    | E9/K21 | M18 AO |
| 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↓   | -      |
| Renewable +A442                 | -                | -      | R13    | -      | -       | M27↑   | M27↓   | -      |
| Swimming pool +A430             | -                | B4     | R20    | -      | M19     | -      | K36    | M19 AO |
| 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) | Orange           | Orange | Orange | Orange | Orange | Orange | Orange | Orange |
| Function block V (accessories)  | Blue             | Blue   | Blue   | Blue   | Blue   | Blue   | Blue   | Blue   |
| Functions                       |                  |        |        |        |        |        |        |        |
| Domestic hot water +A420        | K31              | B8     | R3     | -      | (Y)M18 | M24    | E9/K21 | M18 AO |
| 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.

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 **Note**

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

---

 **CAUTION**

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

**6 Technical device information**

|                                            |                                                    |
|--------------------------------------------|----------------------------------------------------|
| Nominal voltage                            | 230 V AC 50 Hz                                     |
| Voltage range                              | 195 to 253 V AC                                    |
| Power consumption                          | 50 VA                                              |
| Degree of protection according to EN 60529 | IP 20                                              |
| Switching capacity of outputs              | See circuit diagram (depending on the output)      |
| Fuse breaking capacity                     | ≤ 1.5 kA                                           |
| Operating temperature                      | 0°C to +35°C                                       |
| Storage temperature                        | -15 °C to +60 °C                                   |
| Weight                                     | 12.6 kg with packaging<br>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                                             |







## The complete program: Reliable technology and prompt, professional service

|                                                                                     |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|    | <p><b>W Burners</b> <b>up to 700 kW</b></p> <p>The compact burners, proven millions of times over, are economical and reliable. Available as gas, oil and dual fuel burners for domestic and commercial applications.</p>                                                                          | <p><b>Wall-hung condensing boilers for gas</b> <b>up to 800 kW</b></p> <p>The wall-hung condensing boilers WTC-GW have been developed to meet the highest demands in ease of operation and efficiency. Modulating operation means these units operate quietly and economically.</p>                                                                   |    |
|    | <p><b>monarch® WM Burners and Industrial Burners</b> <b>up to 12,000 kW</b></p> <p>These legendary industrial burners are durable and versatile. Numerous variations of oil, gas and dual fuel burners meet a wide range of applications and capacity requirements.</p>                            | <p><b>Floor-standing condensing boilers for oil and gas</b> <b>up to 1,200 kW</b></p> <p>The floor-standing condensing boilers WTC-GB (up to 300 kW) and WTC-OB (up to 45 kW) are efficient, low in pollutants and versatile in use. Even the largest capacities can be covered by cascading up to four gas condensing boilers.</p>                   |    |
|  | <p><b>WKmono 80 Burners</b> <b>up to 17,000 kW</b></p> <p>The WKmono 80 burners are the most powerful monoblock burners from Weishaupt. They are available as oil, gas or dual fuel burners and are designed for tough industrial application.</p>                                                 | <p><b>Solar systems</b></p> <p>The stylish flat-plate collectors are the ideal complement for any Weishaupt heating system. They are suitable for solar water heating and for combined heating support. With versions for on-roof, in-roof and flat roof installations, solar energy can be utilised on almost any roof.</p>                          |  |
|  | <p><b>WK Burners</b> <b>up to 32,000 kW</b></p> <p>These industrial burners of modular construction are adaptable, robust and powerful. Even on the toughest industrial applications these oil, gas and dual fuel burners operate reliably.</p>                                                    | <p><b>Water heaters/Energy storage</b></p> <p>The diverse program of potable water and energy storage for various heat sources includes storage volumes of 70 to 3,000 litres. In order to minimize storage losses, potable water cylinders from 140 to 500 litres are available with highly efficient insulation using vacuum insulation panels.</p> |  |
|  | <p><b>MCR Technology / Building Automation from Neuberger</b></p> <p>From control panels to complete building management systems - at Weishaupt you can find the entire spectrum of modern control technology. Future orientated, economical and flexible.</p>                                     | <p><b>Heat pumps</b> <b>up to 180 kW (Single device)</b></p> <p>The heat pump range offers solutions for the utilisation of heat from the air, the soil or ground water. Some systems are also suitable for cooling buildings.</p>                                                                                                                    |  |
|  | <p><b>Service</b></p> <p>Weishaupt customers can be assured that specialist knowledge and tools are available whenever they are needed. Our service engineers are fully qualified and have extensive product knowledge, be it for burners, heat pumps, condensing boilers or solar collectors.</p> | <p><b>Geothermal probe drilling</b></p> <p>With its daughter company, BauGrund Süd, Weishaupt also offers geothermal probe and well drilling. With the experience of more than 17,000 systems and more than 3.2 million meters of drilling, BauGrund Süd offers a comprehensive service program.</p>                                                  |  |