

Safety information

Expert electricians only may open this device in due compliance with the wiring diagram shown in the housing cover / on the housing / represented in the corresponding operating instructions. All expert electricians charged with the execution of such works must comply with the relevant safety regulations currently operative and in force. **Caution:** The operation of the controller in the vicinity of other devices that do not comply with the EMC directives may affect its functions. The company charged with the installation of the device must, after the completion of the installation works, instruct the user of the control system into its functions and in how to operate it correctly. These operating instructions must be kept at a place that can be accessed freely by the operating and/or servicing personnel in charge.

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1. Application

This room temperature controller has been specially devised for the triggering of fan coils, fan coil devices and other temperature control systems used for the control of normally closed valve-equipped 2- or 4-pipe systems. With these systems, the controller is either used as single room temperature controller (internal sensor) or as external controller that operates based on the data delivered to it by a remote sensor. Regarding other applications not to be foreseen by the manufacturer of this device, the safety standards concerning these applications need to be followed and adhered to. Regarding the aptitude of the device for any such other application, please refer to section 8. herein (Warranty).

2. Functional description

The switching difference of the controller comes to 0.5K. The control characteristics of the following control system examples assume the occurrence of a control deviation of 1K.

2.1 Application in 2-pipe systems with either manual or automatic heating/cooling changeover

The switch S3 (see section 7.) enables to adjust the controller to the existing pipe system. If using it for the control of 2-pipe systems (factory setting), the output at terminal 2 triggers the heating/cooling valve. The heating/cooling changeover contact (terminals 14 and 15) determines the direction of operation controlled by the device. Contact closed = heating, contact open = cooling. Optionally, a flow sensor (see sections 4. and 6.) can be connected in place of the contact, which allows to achieve the automated changeover between heating and cooling mode. Regarding the changeover points when using a flow sensor, please refer to section 5.

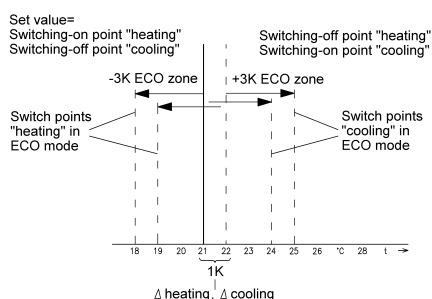
Control characteristic during operation in heating mode

The heating is being activated each time the temperature falls below the adjusted set value. As soon as the temperature rises by a value that corresponds to the switching difference of approx. 1K, the heating is being deactivated again. The desired temperature value will not be under-run, therefore, which guarantees optimum comfort.

Cooling mode control characteristics

Once the adjusted temperature value is not attained, operation in cooling mode is being deactivated. After a rise of the temperature approx. 1K (switching difference), operation in cooling mode is being activated again.

Switch points in 2-pipe systems (heating or cooling)



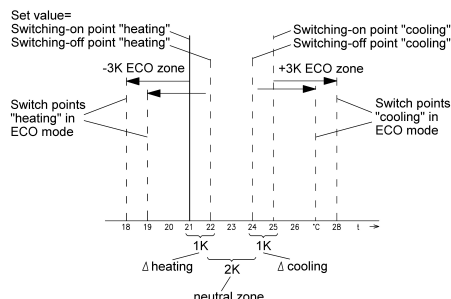
2.2 Application in 4-pipe systems

The switch S3 (see section 7.) enables to adjust the controller to the existing pipe system. If using the device for the control of 4-pipe systems, the heating output at terminal 1 triggers the heating operations and the cooling output at terminal 2 the cooling operations.

Control characteristics when operating with neutral zone

The neutral zone can be set within a range from 0.5K to 6K (factory setting 2K) and begins at the heating switch-off point. If set to 21°C, the heating will be set to a temperature above 21°C while operating in heating mode and down to a temperature below 25°C while operating in cooling mode. In both heating and cooling mode, the switching difference comes to approx. 1K. If set to 21°C, the heating switch-off point is thus at approx. 22°C and the cooling switch-off point at approx. 24°C.

Switch points when controlling 4-pipe systems (heating, neutral zone, cooling)



2.3 Option to select between internal or external sensor-based operation

The selector switch S4 (see section 7.) allows to set the device for either the utilisation of the internal (factory setting) or the external sensor. The terminals 12 and 13 have been provided for the connection of the external sensor. For a selection of suitable sensors, please refer to sections 4., “Accessories”, and 6., “Data table with external sensor data (characteristic curve)”.

2.4 Fan function

The controller described here is equipped with a 3-step switch for the selection of the desired fan stage. The switch S2 (see section 7.) allows to set the fan ON (factory setting) or OFF within the neutral zone. In order to enable the internal sensor to detect the room temperature in an optimal manner, we recommend setting the fan in the neutral zone to ON when controlling temperature equalization systems that feature a fan-assisted convection of the ambient air. The fan is permanently activated in this case. If setting the fan to OFF within the neutral zone, it remains deactivated across the entire temperature range, i.e. between the switch-off points “heating” and “cooling” (= neutral zone, see diagram “Switch-points within 4-pipe systems”), the activation of the fan while operating in heating mode takes place above the corresponding switch-point level and, while operating in cooling mode, is deactivated below the related switch point level. Each time after deactivation of the heating or cooling mode, the fan performs a 5-minute overrun. To allow the triggering of fan motors with separated windings or fan motors using a step-down transformer, the triggering of the fan has been realised in a potential-free manner. **Caution:** No protection class III fans or other protection class III consumers must be connected.

2.5 ON/OFF function

Actuating the ON/OFF switch activates or deactivates the control system. The antifreezing function remains active even after the deactivation of the system.

2.6 Antifreezing function

The antifreezing function protects the controlled room against cooling down thoroughly and thus against any frost damage due to it. In the event the temperature measured by the activated internal or external sensor falls below approx. 5°C, the valve output “heating” within the controlled 4-pipe system is activated. In 2-pipe systems, the same applies with regard to the valve output “heating/cooling”, which is activated along with the fan output. The controller is deactivated again, once a temperature of 6°C is being exceeded.

2.7 Contact inputs ON/OFF – ECO

The following function can be triggered via the terminals 16 and 17 (safety extra low voltage) depending on the position of the switch S1: (see section 7.) Switch S1 in the position “ON” (factory setting) → ECO function (energy economizing function). The triggering of the energy economizing function is effected by an external contact (terminals 16 and 17). Once this function is activated, the temperature is, while operating in heating mode, being set to a temperature that, in relation to the set value, is by 3K lower and, while operating in cooling mode, to a temperature that transcends the set value by 3K (ECO zone $\pm 3K$). When controlling 4-pipe systems, the neutral zone of 2K is being extended by $\pm 3K$ once the ECO function has been triggered. If, for instance, the ECO function is triggered after adjusting a set value of 21°C and the setting of a neutral zone of 2K, the control operations performed by the system in heating mode aim at reaching a temperature of 18°C and aim at reaching a temperature of 28°C while operating in cooling mode (see sections 2.1 and 2.2). This enables to save energy in a room- and/or floor-wise manner. The ECO function is mainly used in hotels where, apart from the saving of energy, the standby function is necessary in order to hand over the room to the hotel guest in a neither too warm nor too cold condition and where the well-being temperature shall be attained in this room as soon as possible after it has been occupied by a guest. It is impossible to bring the system to perform control operations aimed at reaching temperatures below a level of 5°C by setting the temperature to a minimum value and triggering the ECO function. Contact closed = normal operation, contact open = operation in ECO mode. Switch S1 set to “OFF” → The antifreezing function is active. An external contact (window contact or timer, f. ex.) connected to the terminals 16 and 17 enables to deactivate the control operations performed by the system from a distance. Contact closed = control system activated, contact open = control system deactivated.

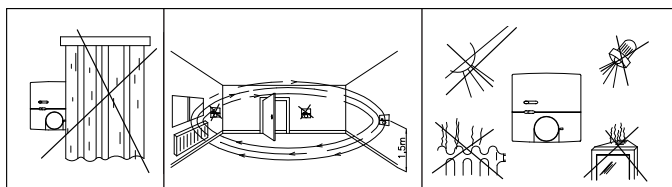
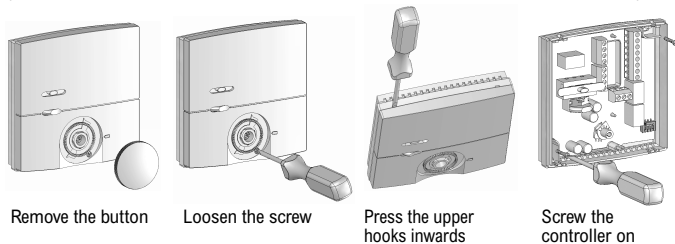
2.8 Emergency operation function in the event of a sensor breakage or sensor short-circuit

The emergency operation shall avoid the occurrence of critical temperature conditions in the room to be controlled if a sensor breakdown or short-circuit occurs. Once this is the case, the heating valve output is being triggered at a level that is equivalent to 30% of the normal operating time (3 minutes ON, 7 minutes OFF). To prevent the related room from cooling down thoroughly and ensure its protection against frost damages, heating in 2-pipe systems thus takes place if the heating/cooling contact is in heating position and takes place in 4-pipe systems at the above-mentioned efficiency 30% level.

3. Installation / mounting

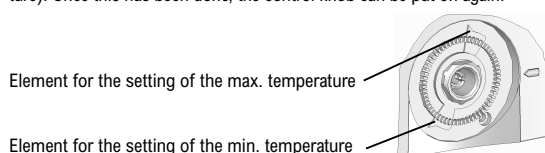
The device is, depending on the type or the packaging size, either delivered in closed, or, in order to facilitate its installation, in opened condition. After its installation on the wall or on an UP box with the aid of the adapter plate JZ-17, its electrical connection and the **safe separation between mains voltage and safety extra low voltage using the enclosed partition (see section 7.)**, the housing cover needs to be closed by hooking the lower hooks in the housing and folding the cover upward until it clicks into place. Following this, the housing cover should be secured using the accompanying screw. For the opening of the device follow the above steps in inverse order. **Caution:** The device must not be mounted on electrically conductive surfaces. When using an external sensor, care must be taken to ensure that the sensor line is not laid in parallel to line voltage carrying cables or lines. Where parallel laying cannot be avoided, a shielded line is to be used and the shielding to be connected to the terminal 13, 15 or 17. In order to ensure the easy replacement of a defective sensor, the sensor including its line needs to be laid inside an empty conduit in a replaceable manner.

The controller is determined for wall mounting or installation on an UP box and must not be exposed to direct heat or cold sources. Also care must be taken to ensure that the device is not exposed to the influence of foreign heat or cold sources that warm or cool the device at its back (through air flows in cavity walls or the temperatures radiated by ascending pipelines, f. ex.).



3.1 Limitation of the temperature setting range

The mobile setting elements underneath the control knob enable to delimit the setting range of the controller mechanically. For this purpose, remove the control knob and set the stops as required (red stop for maximum temperature and blue stop for minimum temperature). Once this has been done, the control knob can be put on again.



4. Accessories

- JZ-17, adapter plate for installation on an UP box, including screws for fixing of the controller on the adapter plate.
- Flow sensor for changeover between heating and cooling (changeover sensor): HF-2 (sleeve sensor) or ALF-2 (contact sensor).
- External temperature sensor for use in air ducts or conduits or inside of rooms: LF-2 (cable design air sensor) or HF-2 (sleeve sensor) or GFL-2 (air conduit or air duct sensor for direct installation at the conduit or duct) or BTF2 (ambient temperature sensor).

5. Technical data

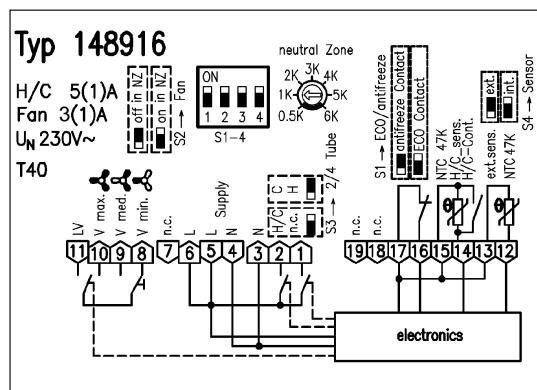
| | |
|---|--|
| Operating and switching voltage: | 230V~ |
| Outputs: | |
| Heating: | relay make contact, max. 5(1)A |
| Cooling: | relay make contact, max. 5(1)A |
| Fan: | 3-step switch, max. 3(1)A |
| Control range: | 5 ... 30°C |
| Switching difference: | 0.5K at a temperature change of 4K/h |
| Neutral zone: | 0.5 ... 6K (factory setting 2K) |
| ECO zone: | ±3K |
| Heating/cooling changeover points in 2-pipe systems when using a flow sensor: | NTC 47k |
| Switch point "cooling": | when falling below a temp. of 18°C |
| Switch point "heating": | when transcending a temp. of 26°C |
| Tolerance of external sensor: | approx. 1K |
| Antifreezing temperature: | approx. 5°C (underrunning of this temperature impossible thanks to ECO function) |
| Frost protection switching difference: | approx. +1K |
| Power consumption: | 2VA |
| Protection class: | II (after conforming installation) |
| Degree of protection: | IP30 (after conforming installation) |
| Admissible ambient temperature: | 0 ... 40°C |
| Storage temperature: | -20 ... 70°C |
| Admissible air moisture: | max. 95% RH, non condensing |
| Mounting: | wall mounting or mounting on an UP box |
| Housing material and colour: | plastic (ABS), pure white (similar to RAL 9010) |
| Equipment: | ON/OFF switch, 3-step fan switch, mechanical range limitation, DIP switch for function selection |

6. Data table with external sensor data (characteristic curve)

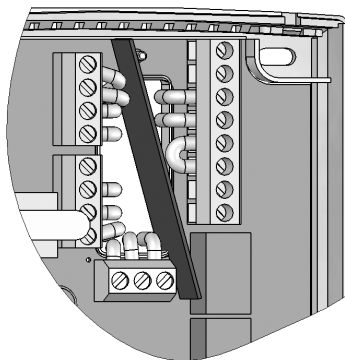
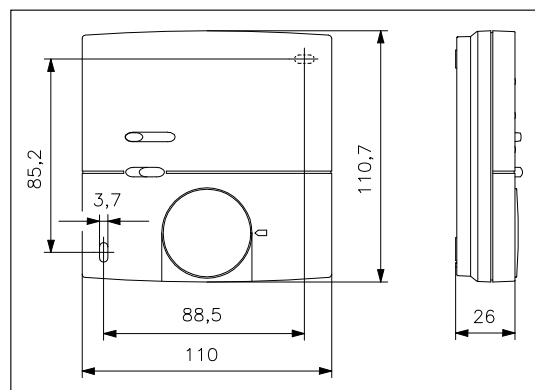
The sensor table applies to both the optional changeover sensor and the external temperature sensor.

| Sensor „2“ – NTC 47k | |
|-------------------------|-----------------------|
| Sensor temperature [°C] | Resistance value [kΩ] |
| -10 | 264.028 |
| 0 | 155.480 |
| 10 | 94.377 |
| 15 | 74.314 |
| 20 | 58.910 |
| 25 | 47.000 |
| 30 | 37.732 |
| 40 | 24.750 |
| 50 | 16.597 |

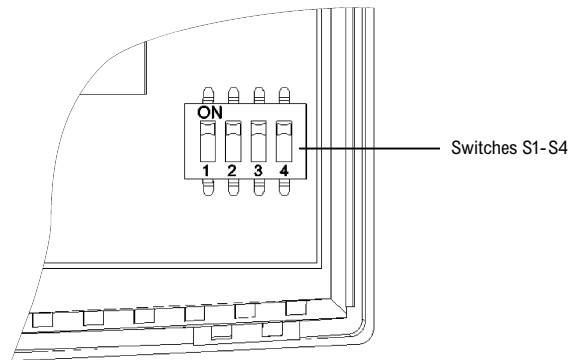
7. Dimensioned drawings and connection diagrams / overview of DIP switch positions (S1 to S4)



Caution:
In case the external contact input at the terminals 16 and 17 is not required, these terminals have to be connected with the aid of a jumper.



Caution:
Make sure to mount the partition for the safe separation between mains voltage and safety extra low voltage accordingly.



8. Warranty

The technical data specified in these instructions have been determined under laboratory conditions and in compliance with generally approved test regulations, in particular DIN standards. Technical characteristics can only be warranted to this extent. The testing with regard to the qualification and suitability for the client's intended application or the use under service conditions shall be the client's own duty. We refuse to grant any warranty with regard thereto. Subject to change without notice.