

# WRF04 (x) (LCD) RS485 Modbus

Room temperature sensor/ Room operating unit/ Room controller

**thermokon**<sup>®</sup>  
HOME OF SENSOR TECHNOLOGY

## Datasheet

Subject to technical alteration  
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*Illustration similar, depending on the type*

## » APPLICATION

The surface-mounted room controller is used for individual temperature control in living, hotel and office rooms. Possible operating elements are potentiometers, rotary switches, buttons and LEDs for setpoint adjustment, fan level selection, presence detection and visual feedback. Depending on the type, continuous or 2-point valves can be controlled for heating or cooling. The connection terminal in the lower housing part allows pre-wiring.

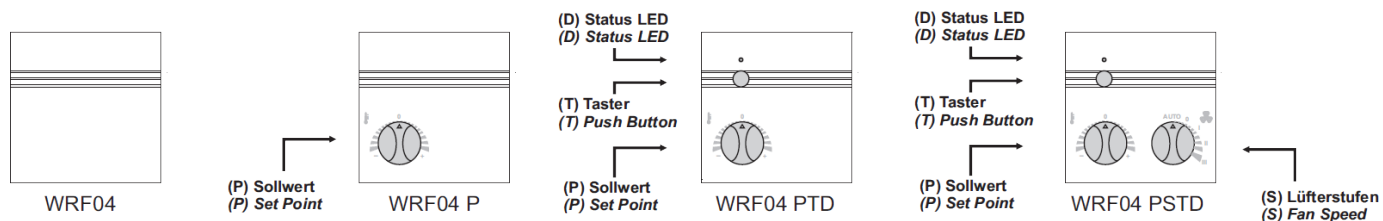
## » TYPES AVAILABLE

### Room controller temperature optional with LCD – active BUS

- WRF04 (x) (LCD) AO2V RS485 Modbus

### Room controller/ operating unit temperature optional with LCD – active BUS with flush mounted IO module

- WRF04 (x) (LCD) DO2R RS485 Modbus
- WRF04 (x) (LCD) DO2T RS485 Modbus
- WRF04 (x) (LCD) OVR RS485 Modbus
- WRF04 (x) (LCD) OVT RS485 Modbus



### optional operating elements

P = Potentiometer – Set point adjustment

T = Button – Occupancy

S = Rocker switch – Fan speed adjustment

FSx = Number of switching stages

## » SECURITY ADVICE – CAUTION

The installation and assembly of electrical equipment should only be performed by authorized personnel.



The product should only be used for the intended application. Unauthorised modifications are prohibited! The product must not be used in relation with any equipment that in case of a failure may threaten, directly or indirectly, human health or life or result in danger to human beings, animals or assets. Ensure all power is disconnected before installing. Do not connect to live/operating equipment.

Please comply with

- Local laws, health & safety regulations, technical standards and regulations
- Condition of the device at the time of installation, to ensure safe installation
- This data sheet and installation manual

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## » NOTES ON DISPOSAL



The crossed-out wheeled bin symbol indicates that the product or removable batteries must not be disposed of with household or commercial waste. Within the EU, you are legally obliged to dispose of the product separately and appropriately in accordance with the national laws of your country. Alternatively, please contact your supplier or Thermokon Sensortechnik GmbH. Further information can be found at: [www.thermokon.com](http://www.thermokon.com)

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## » REMARKS TO ROOM SENSORS

### Location and Accuracy of Room Sensors

The room sensor should be mounted in a suitable location for measuring accurate room temperature. The accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important, that the back plate is completely flush to the wall so that there is sufficient circulation of air through the vents in the cover, otherwise, deviations in temperature measurement will occur due to uncontrolled air circulation. The temperature sensor should not be covered by furniture or other objects. Mounting next to doors (due to draught) or windows (due to colder outside wall) should be avoided.

### Surface and Flush Mounting

The measuring result is influenced by the thermal characteristics of the wall. A solid concrete wall responds to thermal fluctuations within a room in a much slower than a light-weight structure wall. Room temperature sensors installed in flush-mounted boxes have a longer response time to thermal variations. In extreme cases they detect the radiant heat of the wall even if the air temperature in the room is lower for example. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor is the smaller the deviations limited in time are.

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## » BUILD-UP OF SELF-HEATING BY ELECTRICAL DISSIPATIVE POWER

Temperature sensors with electronic components always have a dissipative power, which affects the temperature measurement of the ambient air. The dissipation in active temperature sensors shows a linear increase with rising operating voltage. This dissipative power has to be considered when measuring temperature. In case of a fixed operating voltage ( $\pm 0,2$  V) this is normally done by adding or reducing a constant offset value. As Thermokon transducers work with a variable operating voltage, only one operating voltage can be taken into consideration, for reasons of production engineering. Transducers 0..10 V / 4..20 mA have a standard setting at an operating voltage of 24 V =. That means, that at this voltage, the expected measuring error of the output signal will be the least. For other operating voltages, the offset error will be increased or lowered by a changing power loss of the sensor electronics. If a re-calibration should become necessary later directly on the sensor, this can be done by means of a trimming potentiometer on the sensor board.

**Remark: Occurring draft leads to a better carrying-off of dissipative power at the sensor. Thus temporally limited fluctuations might occur upon temperature measurement.**

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## » PRODUCT TESTING AND CERTIFICATION



### Declaration of conformity

The declaration of conformity of the products can be found on our website <https://www.thermokon.de/>

## » TECHNICAL DATA

|                                              |                                                                                                                                                                                                                                    |                                                     |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| Measuring values                             | temperature                                                                                                                                                                                                                        |                                                     |
| Output voltage<br>(type-dependent)           | <b>AO2V</b><br>2x 0..10 V, heating & cooling or 6-way-valve (min. load 10 kΩ)                                                                                                                                                      |                                                     |
| Output switching contact<br>(type-dependent) | <b>DO2R   OVR (Relay)</b><br>switching contact 24 V / 3 A, floating                                                                                                                                                                | <b>DO2T   OVT (Triac)</b><br>24 V ~ / 1 A, floating |
| Network technology                           | RS485 Modbus, RTU or ASCII, half-duplex, baud rate 9.600, 19.200, 38.400 or 57.600, parity: non (2 stopbits), even or odd (1 stopbit)                                                                                              |                                                     |
| Power supply*                                | 15..24 V = (±10%) or 24 V ~ (±10%) SELV                                                                                                                                                                                            |                                                     |
| Power consumption                            | typ. 0,4 W (24 V =)   0,6 VA (24 V ~)                                                                                                                                                                                              |                                                     |
| Measuring range temperature                  | +32..+122 °F                                                                                                                                                                                                                       |                                                     |
| Accuracy temperature                         | ±0,5 K (typ. at 70 °F)                                                                                                                                                                                                             |                                                     |
| Inputs                                       | 2 inputs for floating contacts                                                                                                                                                                                                     |                                                     |
| Set point (P)<br>(optional)                  | set point adjustment                                                                                                                                                                                                               |                                                     |
| Rotary switch (S)<br>(optional)              | setpoint adjustment (max. 5 stages), 2-stages (0,I), 3-stages (0,I,II), 4-stages (0,I,II,III) or 5-stages (Auto,0, I, II, III)                                                                                                     |                                                     |
| Button (T)<br>(optional)                     | presence detection                                                                                                                                                                                                                 |                                                     |
| LED (D)<br>(optional)                        | 1 LED for status feedback, color green, red or yellow                                                                                                                                                                              |                                                     |
| Functions                                    | with integrated PI controller                                                                                                                                                                                                      |                                                     |
| Labelling                                    | <b>rotary switch</b><br>0,I or 0,I,II or 0,I,II,III or Auto,0,I,II,III                                                                                                                                                             | <b>set point</b><br>-,0,+                           |
| Display<br>(optional)                        | LCD 1.14x0.47 in., monochrome                                                                                                                                                                                                      |                                                     |
| Enclosure                                    | PC, pure white                                                                                                                                                                                                                     |                                                     |
| Protection                                   | IP30 according to EN 60529                                                                                                                                                                                                         |                                                     |
| Cable entry                                  | breaking points top/bottom, rear entry                                                                                                                                                                                             |                                                     |
| Connection electrical                        | Terminal block, max. AWG16                                                                                                                                                                                                         |                                                     |
| Ambient condition                            | -31..+158 °C, max. 85% rH non-condensing                                                                                                                                                                                           |                                                     |
| Mounting                                     | surface mounted on flush-mounting box (Ø=2.36in.   60 mm), or to be mounted flat onto the surface using screws, with frame for surface mounting (accessory) or directly on the wall, base part can be mounted and wired separately |                                                     |
| Notes                                        | special painting available on request, enclosure stainless steel available                                                                                                                                                         |                                                     |

## \*Power supply

When several BUS devices are supplied by one 24 V AC voltage supply, it is to be ensured that all "positive" operating voltage input terminals (+) of the field devices are connected with each other and all "negative" operating voltage input terminals (-) (=reference potential) are connected together (in-phase connection of field devices).

In case of reversed polarity at one field device, a supply voltage short-circuit would be caused by that device. The consequential short-circuit current flowing through this field may cause damage to it.

Therefore, pay attention to correct wiring.

## » IO-MODUL

|                                       |                                     |
|---------------------------------------|-------------------------------------|
| Power consumption<br>(with IO module) | typ. 0,7 W (24 V =)   1 VA (24 V ~) |
| Enclosure                             | ABS, black                          |
| Protection                            | IP00 according to EN 60529          |
| Weight                                | 2.82 oz                             |

## » MOUNTING ADVICES

Make sure that the device is power-off, if you install it!

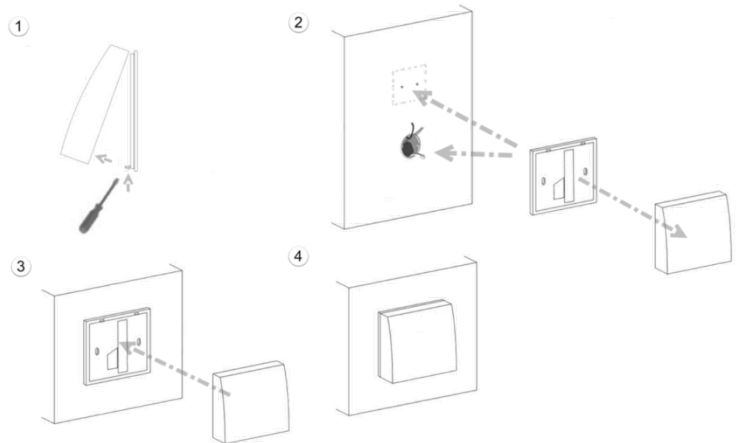
The device can be installed on a smooth wall surface or a flush box. It should be selected a representative location for the measuring medias. The use of deep installation boxes is recommended due to the increased storage capacity for the cabling.

Sunlight and drafts e.g. in conduit must be avoided so that the measuring result is not distorted. If necessary, is the end of the installation tube seal

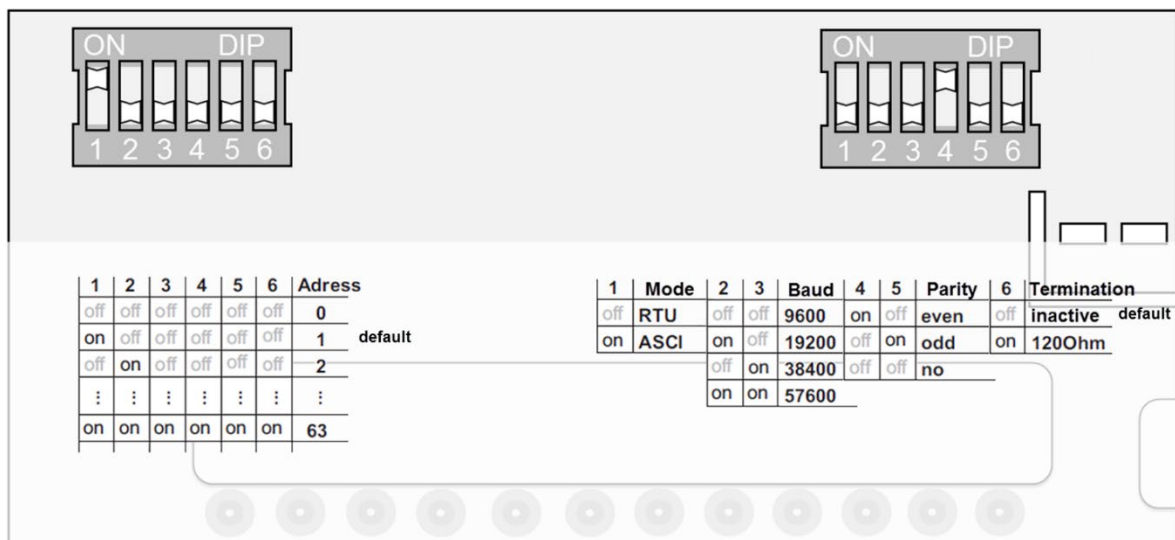
(1) For wiring, the upper part of the base plate must be solved. Base plate and upper part are connected with each other by mounting clips.

(2) The installation of the base plate to the smooth wall surface can be done with plugs and screws.

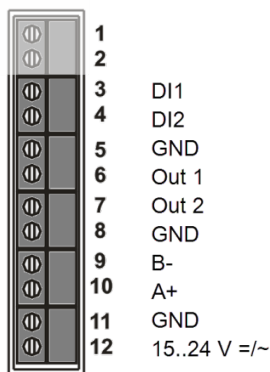
(3) Then, the device is placed on the base plate.



## » CONNECTION PLAN

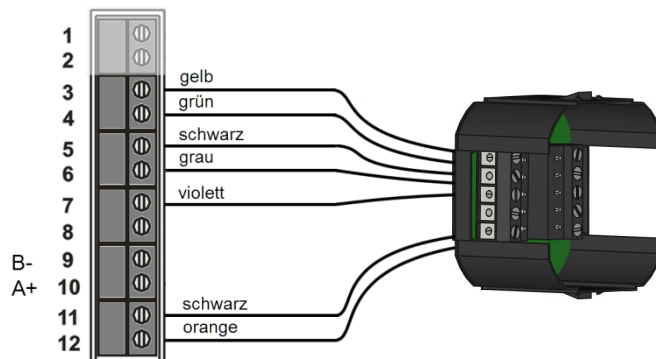


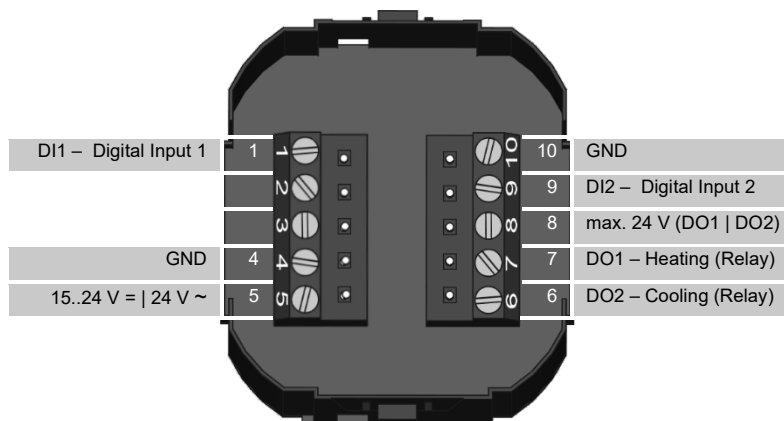
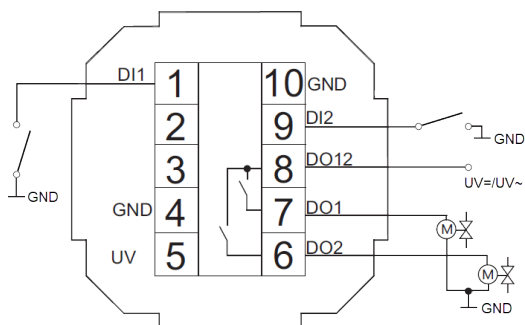
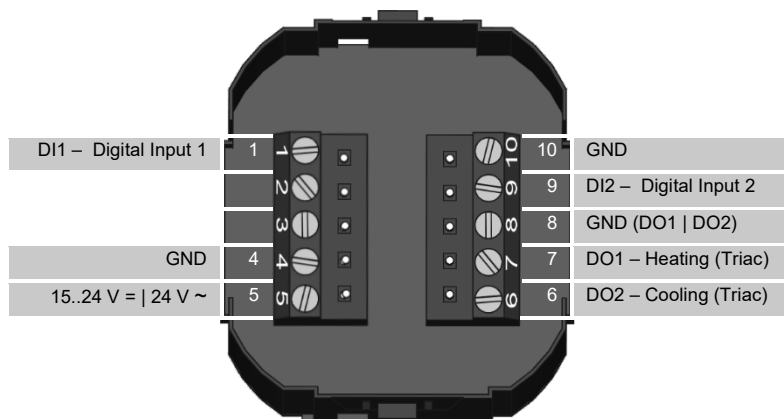
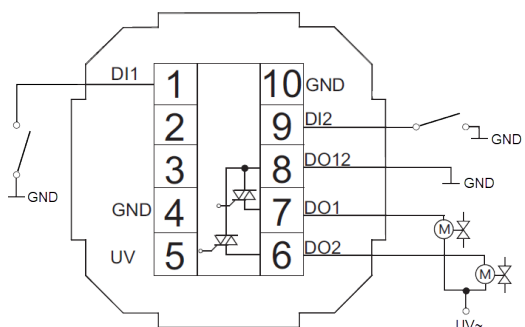
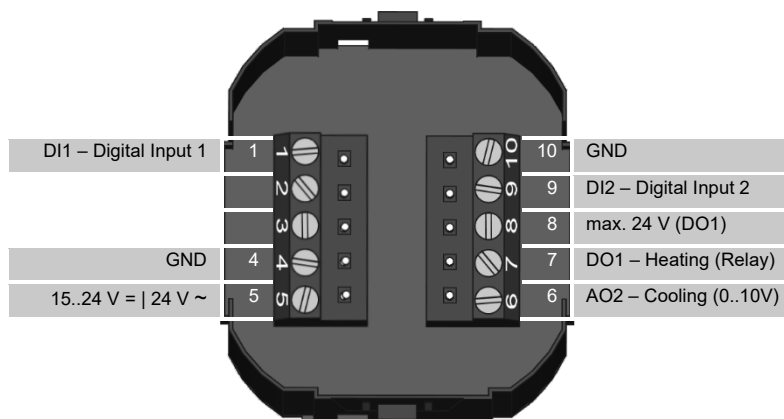
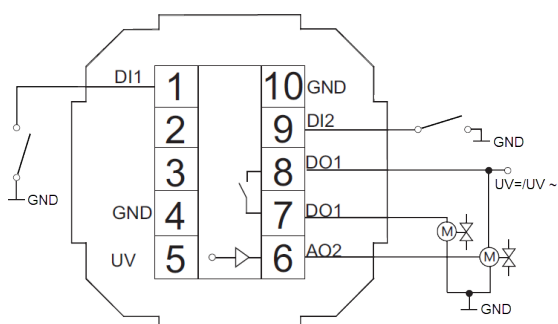
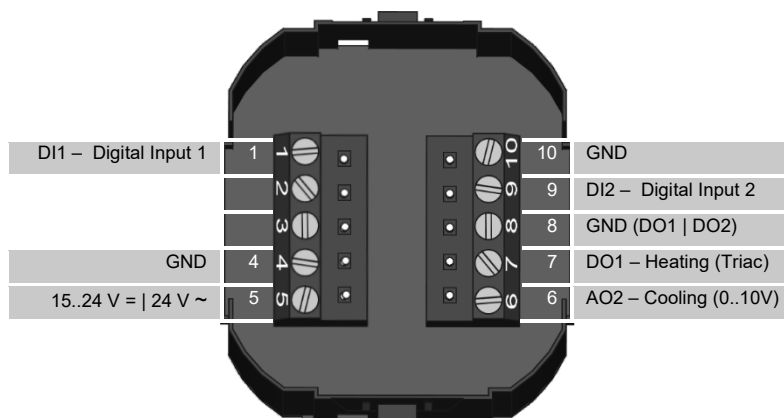
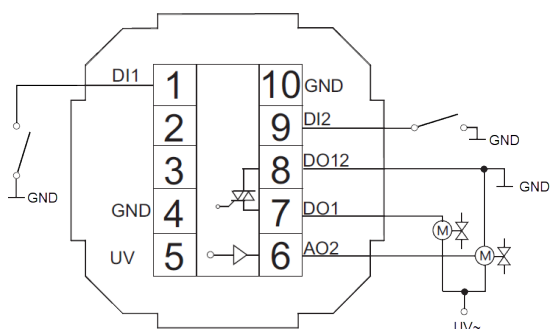
### WRF04 (x) (LCD)AO2V



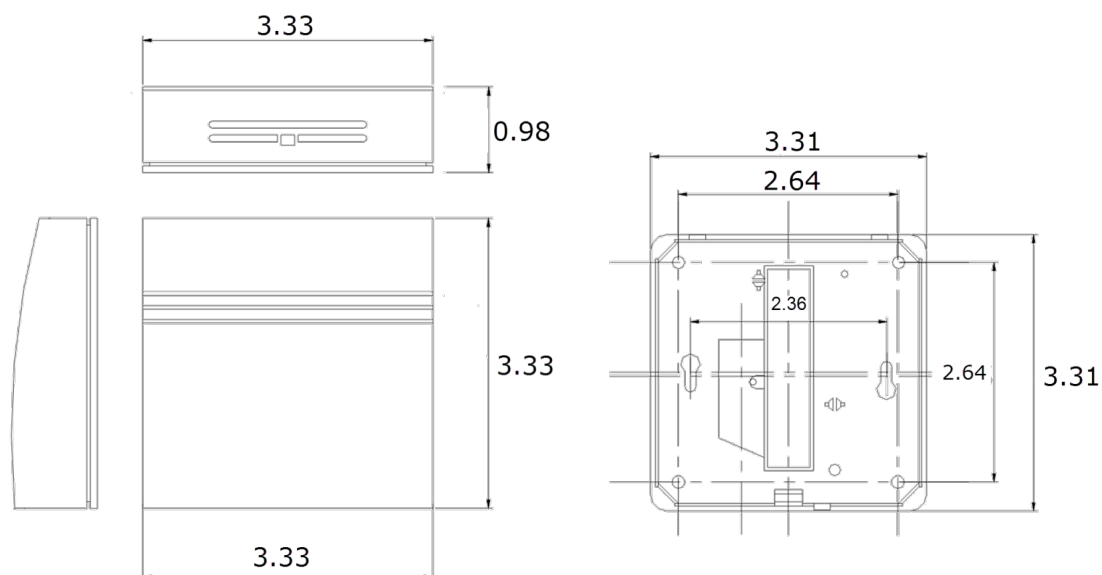
### with IO-module (optional)

The Modbus connection is performed on the mainboard

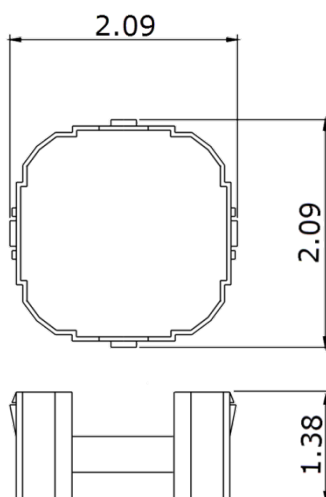


**WRF04 (x) (LCD) DO2R IO-module****WRF04 (x) (LCD) DO2T IO-module****WRF04 (x) (LCD) OVR IO-module****WRF04 (x) (LCD) OVT IO-module**

## » DIMENSIONS (IN.)



## IO-extension (IO module)



## » ACCESSORIES (OPTIONAL)

Rawl plugs and screws (2 pcs. each)  
 Frame for surface mounting WRF04  
 Balls stroke protection BS100 (only for WRF04)

Item No. 660945  
 Item No. 111584  
 Item No. 103312