WRF04 x RS485 Modbus

Room Sensor with RS485 Modbus Interface

thermokon®
Sensortechnik GmbH

Datasheet

Subject to technical alteration
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Application

The room operating panel is designed for temperature detection and integrated manual control of HVAC applications (change set point, change occupancy, change fan speed). With integrated PI controller.

Types Available

WRF04 **P**	MODBUS AO2V	set point potentiometer (P)
WRF04 **PTD**	MODBUS AO2V	set point potentiometer (P), presence button (T) and status-LED (D)
WRF04 **PST**	MODBUS AO2V	set point potentiometer (P), rotary switch (S), presence button (T)
WRF04 **PSTD**	MODBUS AO2V	set point potentiometer (P), rotary switch (S), presence button (T) and status-LED (D)
Type AO2V	2 digital inputs:	floating, parallel to basic device
	2 analogue outputs:	0..10 V / 10 mA for valve control cooling
Type DO2R*	2 digital inputs:	floating, parallel to basic device
	2 relay outputs:	24 V / 3 A for valve control heating/cooling
Type DO2T*	2 digital inputs:	floating, parallel to basic device
	2 Triac outputs:	24 V ~ / 1 A for valve control heating/cooling
Type OVR*	2 digital inputs:	floating, parallel to basic device
	1 relay output:	24 V = / 3 A for valve control heating
	1 analogue outputs:	0..10 V / 10 mA for valve control cooling
Type OVT*	2 digital inputs:	floating, parallel to basic device
	1 Triac output:	24 V ~ / 1 A for valve control heating/cooling
	1 analogue output:	0..10 V / 10 mA for valve control cooling

*IO-extensions

WRF04   WRF04 P   WRF04 PTD   WRF04 PSTD
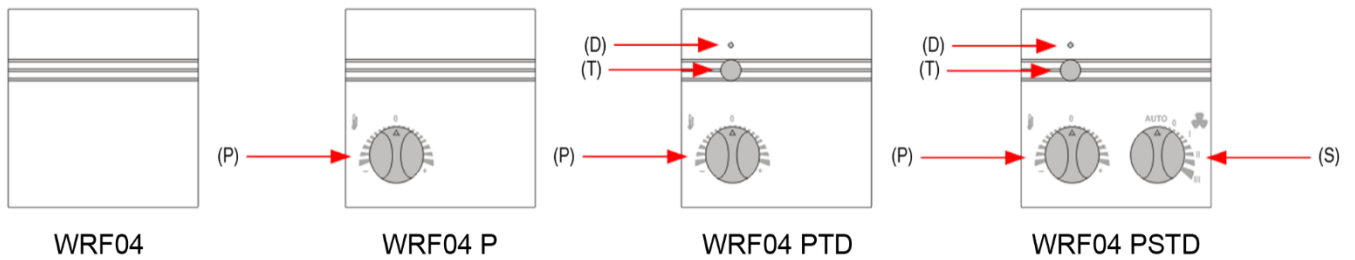
Security Advice – Caution

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

Notes on Disposal

As a component of a large-scale fixed installation, Thermokon products are intended to be used permanently as part of a building or a structure at a pre-defined and dedicated location, hence the Waste Electrical and Electronic Act (WEEE) is not applicable. However, most of the products may contain valuable materials that should be recycled and not disposed of as domestic waste. Please note the relevant regulations for local disposal.

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.

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 (±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 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.
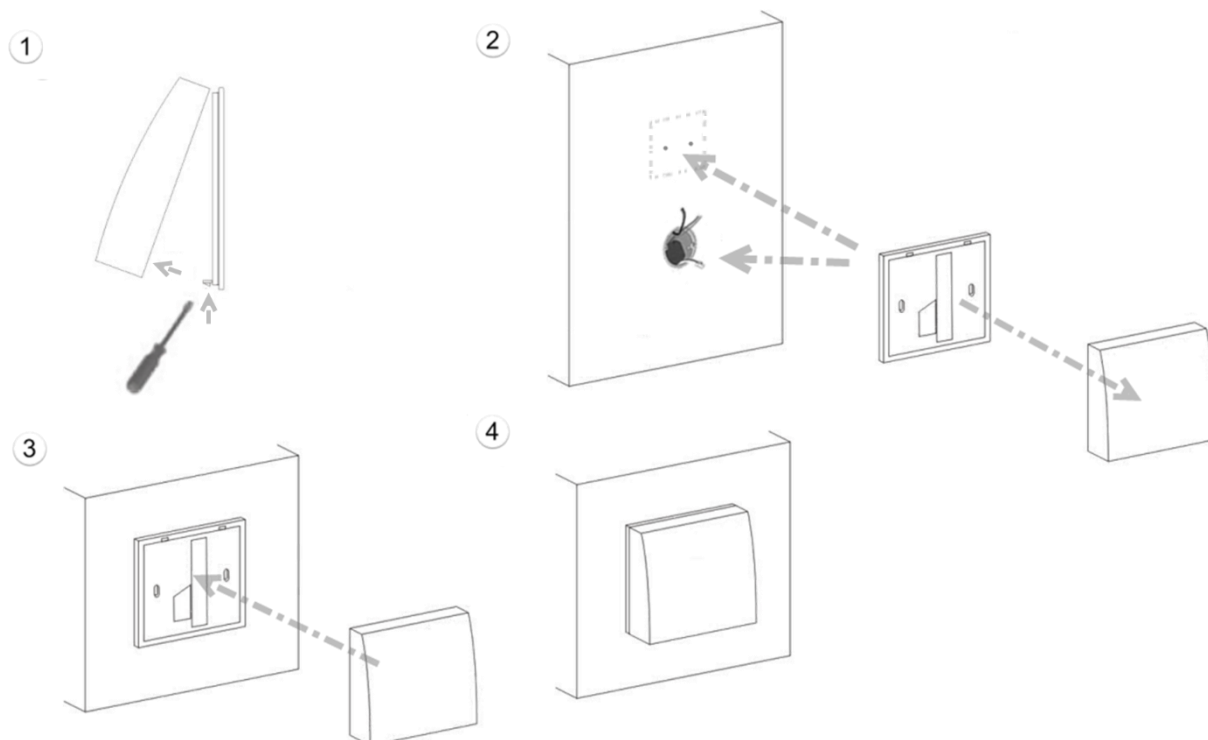
Technical Data

Measuring values		temperature
Output voltage		0..10 V / 10 mA
Output	relay	switching contact 24 V / 3 A, floating
	triac	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%)
Power consumption	WRF04	typ. 0,4 W (24 V =)	0,6 VA (24 V ~)
	with IO-extension	typ. 0,7 W (24 V =)	1 VA (24 V ~)
Measuring range temp		0..+50 °C
Accuracy temperature		±1% of measuring range (typ. at 21 °C)
Inputs		2 inputs for floating contacts
Set point (P)		set point adjustment
Rotary switch (S)		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)		presence detection
LED (D)		status feedback, more LEDs available, colour green, red or yellow
Functions		with integrated PI controller
Labelling	rotary switch	0,I or 0,I,II or 0,I,II,III or Auto,0,I,II,III
	set point	-,0,+
Enclosure	WRF04	PC, pure white
	IO-extension	ABS, black
Protection	WRF04	IP30 according to EN 60529
	IO-extension	IP00 according to EN 60529
Cable entry		breaking points top/bottom, rear entry
Connection electrical		terminal block max. 1,5mm²
Ambient condition		-35..+70 °C, max. 85% rH non-condensing
Weight	WRF04	ca. 95 g
	IO-extension	80 g
Mounting		flush mounted with standard EU box (Ø=55 mm)
		to be mounted flat onto the surface using adhesive foil or screws
Notes		custom colours, labelling and operating elements on request, other sensors on request

Mounting Advices

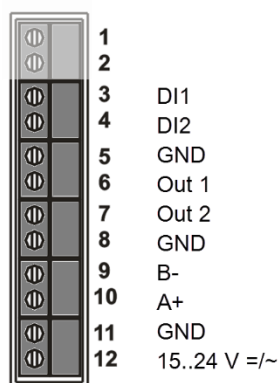The device may be installed in a voltage free condition only.

The device can be installed on a flush-mounted box or directly onto the wall.
If installed on a flush-mounted box, seal the pipe to eliminate drafts.
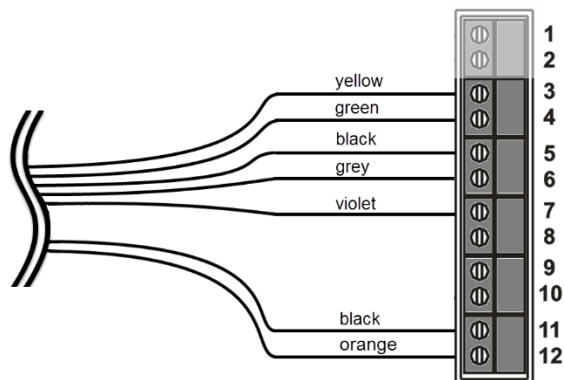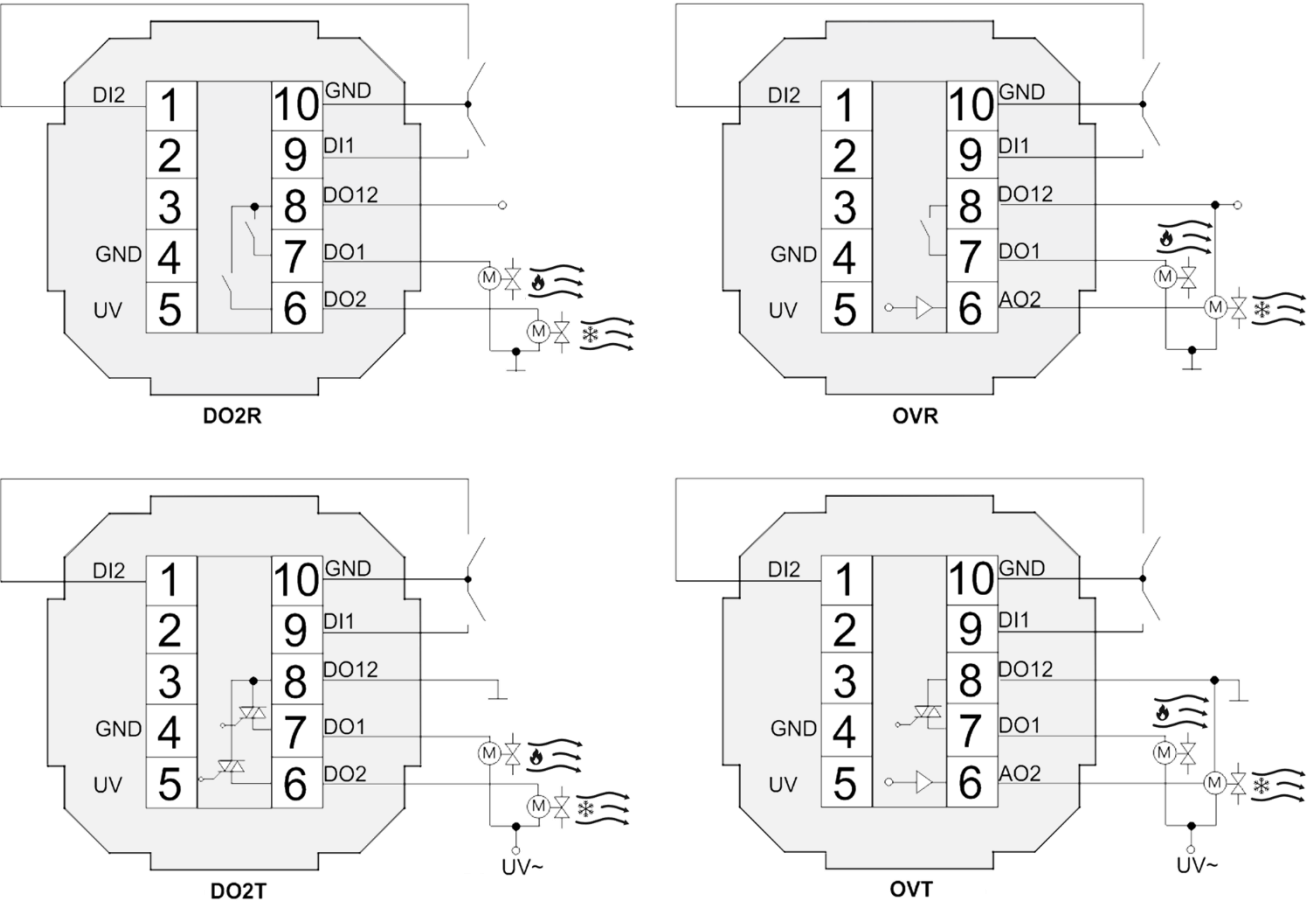
Connection plan

Terminal assignment

IO-extension

Terminal	Assignment
1	
2	
3	DI1
4	DI2
5	GND
6	Out 1
7	Out 2
8	GND
9	B-
10	A+
11	GND
12	15..24 V =/~

IO-extension wire colors:
- yellow — 3
- green — 4
- black — 5
- grey — 6
- violet — 7
- black — 11
- orange — 12

IO-extension

DO2R

OVR

DO2T

OVT

Configuration

1	2	3	4	5	6	Adress	
off	off	off	off	off	off	0	
on	off	off	off	off	off	1	default
off	on	off	off	off	off	2	
⋮	⋮	⋮	⋮	⋮	⋮	⋮	
on	on	on	on	on	on	63	

1	Mode	2	3	Baud	4	5	Parity	6	Termination	
off	RTU	off	off	9600	on	off	even	off	inactive	default
on	ASCI	on	off	19200	off	on	odd	on	120Ohm	
		off	on	38400	off	off	no			
		on	on	57600						

Dimensions (mm)

84,5

25

84,5

84,5

84

67

60

67 84

IO-extension

53

53

35
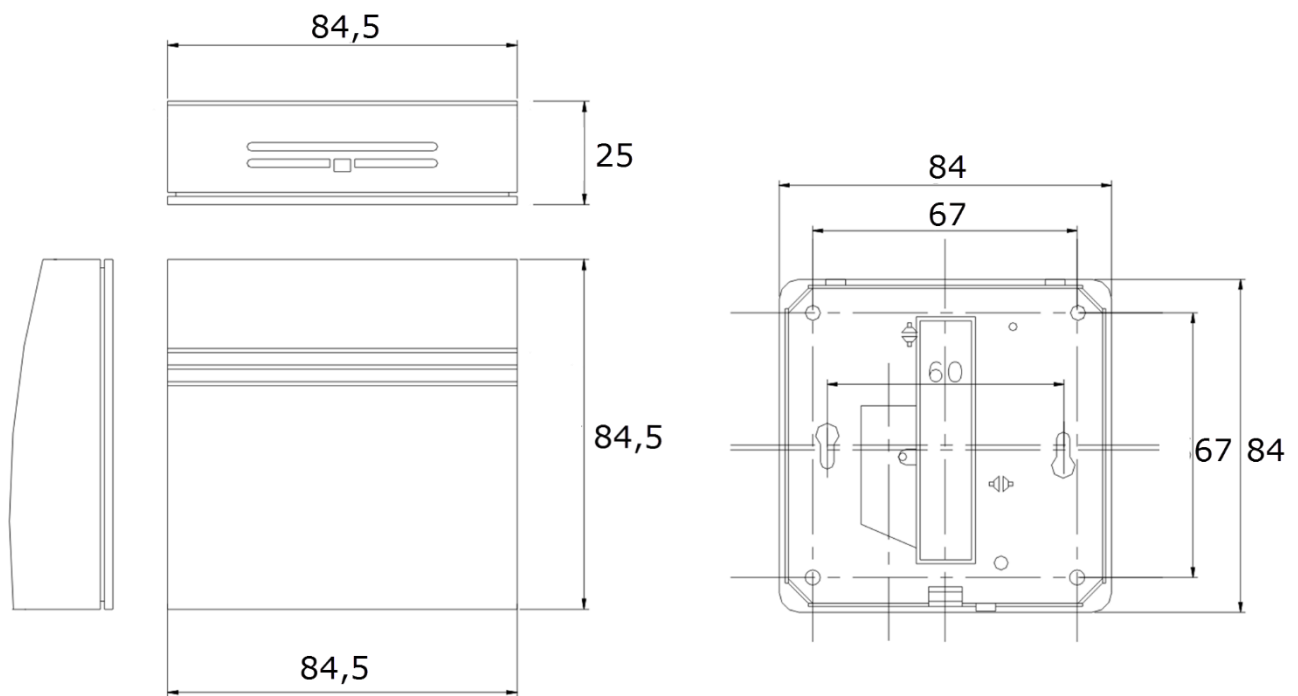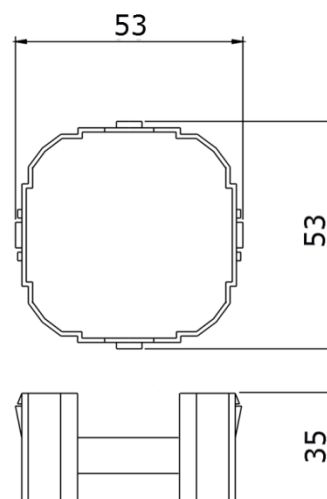
Accessories (optional)

Rawl plugs and screws (2 pcs. each)	Item No. 102209
Frame for surface mounting WRF04	Item No. 111584
Balls stroke protection BS100 (only for WRF04)	Item No. 103312