WRF06 RS485 Modbus

Room sensor with optional rel. Humidity / CO2 / VOC

thermokon®

HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
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» APPLICATION

Flush mounting room sensor for measuring temperature, relative humidity, CO2 and VOC in room and office spaces. For direct connection to a DDC or a monitoring system, for building automation. Also available with traffic light LED for air quality indication.

» TYPES AVAILABLE

Room sensor temperature + relative humidity (opt.) + CO2 (opt.) + VOC (opt.) – BUS
- WRF06 Temp RS485 Modbus
- WRF06 Temp_rH RS485 Modbus
- WRF06 CO2 Temp_rH RS485 Modbus
- WRF06 VOC Temp_rH RS485 Modbus
- WRF06 CO2+VOC Temp_rH RS485 Modbus

» 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

» PRODUCT TESTING AND CERTIFICATION

Declaration of conformity
The declaration of conformity of the products are available on our website
https://www.thermokon.de/direct/en-gb/categories/wrf06

» NOTES ON DISPOSAL

The crossed-out wheelie 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

»GENERAL REMARKS CONCERNING SENSORS

Sensing devices with a transducer should always be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage (±0,2 V). When switching the supply voltage on/off, onsite power surges must be avoided.

»MOUNTING ADVISE ROOM OPERATING PANELS

The Accuracy of the room sensors are influenced by the technical specifications as well as the positioning and the installation type.

During Assembly:
- Seal mounting box (if present).
- Installation type, air draught, heat source, radiation heat or direct sunlight can affect the measurement.
- Bulding material specific properties of the installation place *(brick-, concrete-, partition wall, cavity wall, …)* can affect the measurement.

Assembly not recommendet in…
- Air draught (e.g.: close to windows / doors / fans …)
- Near heating sources,
- Direct sunlight
- Niches / between furniture / …

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

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.

Thermokon transducers can be operated with variable operating voltages. The transducers are set at the factory with a reference operating voltage of 24 V =.

At this voltage, the expected measuring error of the output signal will be the least. Other operating voltages, can cause a measurement deviation changing power loss of the sensor electronics.

A recalibration can be carried out directly on the unit or via a software variable (app or bus).

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

»APPLICATION NOTICE FOR HUMIDITY SENSORS

At regular environmental condition, it is recommended to calibrate the sensor annually to check the compliance with the accuracy required in the application. The following conditions can damage the sensor element or lead in long therm to loss of the specified accuracy:

- Mechanical stress
- Contamination (e.g. dust / fingerprints)
- Aggressive chemicals
- Ambient conditions (e.g. condensation on measuring element)

Do not touch the sensor elements!

Re-calibration or exchange of the sensor element are not subject of the general warranty.

»INFORMATION ABOUT INDOOR AIR QUALITY CO_2

EN 13779 defines several classes for indoor air quality:

Category	CO_2 content above the content in outdoor air in ppm		Description
	Typical range	Standard value	
IDA1	<400 ppm	350 ppm	Good indoor air quality
IDA2	400.. 600 ppm	500 ppm	Standard indoor air quality
IDA3	600..1.000 ppm	800 ppm	Moderate indoor air quality
IDA4	>1.000 ppm	1.200 ppm	Poor indoor air quality

»INFORMATION ABOUT SELF-CALIBRATION FEATURE CO$_2$

All gas sensors are subject to drift. The degree of drift is dependent on the use of components and product design. In addition, the following environmental conditions, among others, can accelerate/ favor the aging and wear of the sensors:

- Mechanical stress (also due to temperature fluctuation)
- Contamination (dust / fingerprints e.g.)
- Abrasive chemicals
- Environmental influences (high humidity / condensation on measuring element)

An internal self calibration function with dual channel technology compensates the caused drift. Thermokon sensors are for permanent use (e.g. hospitals).

»APPLICATION NOTICE FOR AIR QUALITY SENSORS VOC

Volatile organic compunds (VOC) are gaseous and vaporous substances of organic origin in the air. VOC-sensors monitor the significant part of humanly olfactory sensed air quality. (e.g. body odur | tobacco smoke | odur of materials, furniture, carpets, paint, adhesives, …)

The VOC-Value is an application-specific indication for air quality and doesn't provide any information about individual components of VOC

A VOC sensor oxidises the organic molecules that collide with it, which results in changing the resistance of the semiconductor.

Any contact with the sensitive sensors must be avoided and will invalidate the warranty.

The VOC Sensor is factory calibrated and can be calibrated via NOVOSapp subsequently, if needed.

»TECHNICAL DATA

Measuring values	CO2, VOC, temperature + humidity (depending on the device)
Network technology	RS485 Modbus, RTU, half-duplex, baud rate 9.600, 19.200, or 57600, parity: none, even or odd
Power supply*	15..35 V = or 19..29 V ~ SELV
Power consumption	max. 1,6 W (24 V =) | 3,9 VA (24 V ~)
Measuring values temp	0..+50 °C
Accuracy temperature	±0,5 K (typ. at 21 °C)
Measuring range humidity	0..100% rH non-condensing
Accuracy humidity	±2% between 10..90% rH (typ. at 21 °C)
Measuring range CO2 *(type-dependent)*	0..2000 ppm
Accuracy CO2 *(type-dependent)*	±(50 ppm +3% of measured value) typ. at 21 °C, 50% rH, 1015 mbar
Measuring range VOC *(type-dependent)*	0..100 %
Calibration CO2	self-calibration Dual Channel
Sensor	CO2: NDIR (non-dispersive, infrared); VOC: heated metal oxide semiconductor
Display (TLF) *(optional)*	Traffic light function "TLF", 3 LEDs for evaluation and interpretation of any sensor measured value
Enclosure	PC, pure white brilliant, pure white matt, aluminium, anthracite
Protection	IP30 according to EN 60529
Connection electrical	terminal block max. 1,5mm²
Ambient condition	0..+50 °C, max. 85% rH non-condensing
Notes	please specify frame design when ordering

*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 my cause damage to it.

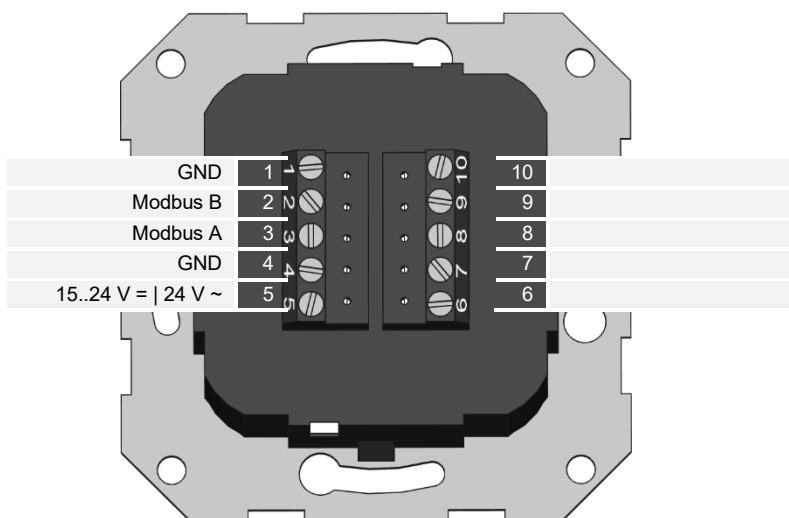Therefore, pay attention to correct wiring.

»SWITCH PROGRAM

Switch ranges Berker	S.1, B.3 Aluminium, B.7 glass
Switch ranges Feller	EDIZIOdue
Switch ranges Gira	E2, E3, Standard 55, Esprit, Event
Switch ranges Jung	LS 990, A 500, AS 500, A plus, A creation, CD 500
Switch ranges Merten	M-Smart, M-Arc, M-Plan, 1-M, Atelier-M, M-Pure, Artec
Switch ranges Peha	Aura, Aura glass

»PROTOCOL DESCRIPTION

Modbus addresses:
A detailed description of the Modbus addresses can be found www.thermokon.de
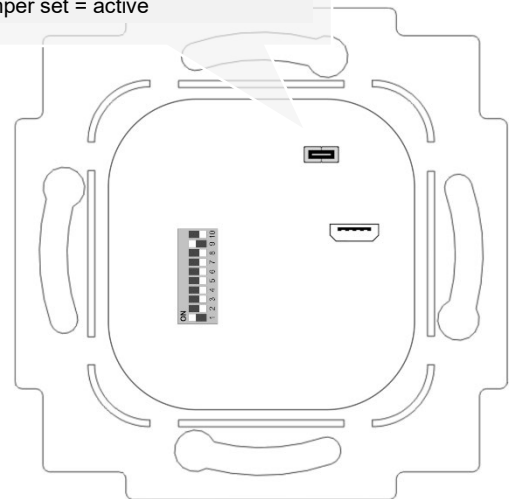
»CONNECTION PLAN

Termination resistor 120 Ohm
Jumper not set = not active (Factory default)
Jumper set = active

GND	1	
Modbus B	2	
Modbus A	3	
GND	4	
15..24 V = | 24 V ~	5	

10	
9	
8	
7	
6	

Do not remove factory set jumpers if no description is available!

»MOUNTING ADVICES

The device is designed for mounting on a flush box. The bus cable is connected to the device by a terminal screw. For pre-wiring, the terminal screw can be drawn from the device.
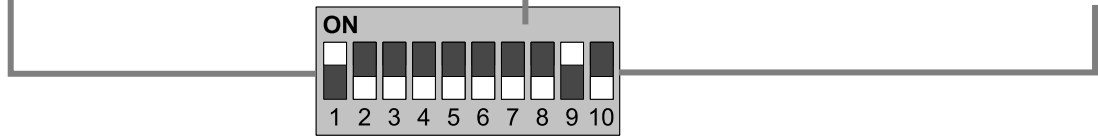
Due to the extended retaining capacity for the cabling, the use of deep installation boxes is recommended. Installation must be made on representative places for the measurement value logging to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. The end of the installation tube in the flush box must be sealed to avoid any draught in the tube falsifying the measuring result.

» DIP-SWITCH CONFIGURATION
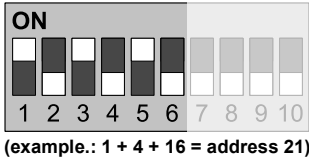
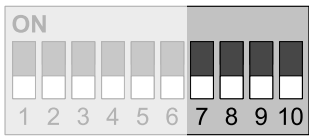| Modbus-address - DIP 1..6 (binary coded)	Baud rate - DIP 7 & 8	Parity / Stopbits - DIP 9 & 10

(picture shows factory default settings)

Modbus Adresse

(example.: 1 + 4 + 16 = address 21)

Dip switch	ON 1 2 3 4 5 6	ON 1 2 3 4 5 6	ON 1 2 3 4 5 6	ON 1 2 3 4 5 6	ON 1 2 3 4 5 6	ON 1 2 3 4 5 6
Value	**on= 2^0 (1)**	on= 2^1 (2)	on= 2^2 (4)	on= 2^3 (8)	on= 2^4 (16)	on= 2^5 (32)

Baud rate - DIP 7 & 8				Parity / Stopbits - DIP 9 & 10			
7 8	7 8	7 8	7 8	9 10	9 10	9 10	9 10
off off	on off	off on	on on	off off	**on off**	off on	on on
9600	19200	38400	57600	None 2 Stopbits	**Even 1 Stopbit**	Odd 1 Stopbit	None 1Stopbit

Operation state BUS communication

LED	Colour	Description
STA	green	Lights up permanently during normal operation
RXD	yellow	Blinks when RS485 Modbus telegrams are received
TXD	yellow	Blinks when RS485 Modbus telegrams are sent
ERR	red	Lights up in case of a corrupt bus configuration and internal errors

Note:
During startup, all 4 LEDs blink for a few seconds.

» DIMENSIONS (MM)

Example: WRF06 Dimensions Insert, *(Frame dimensions manufacturer dependent)*
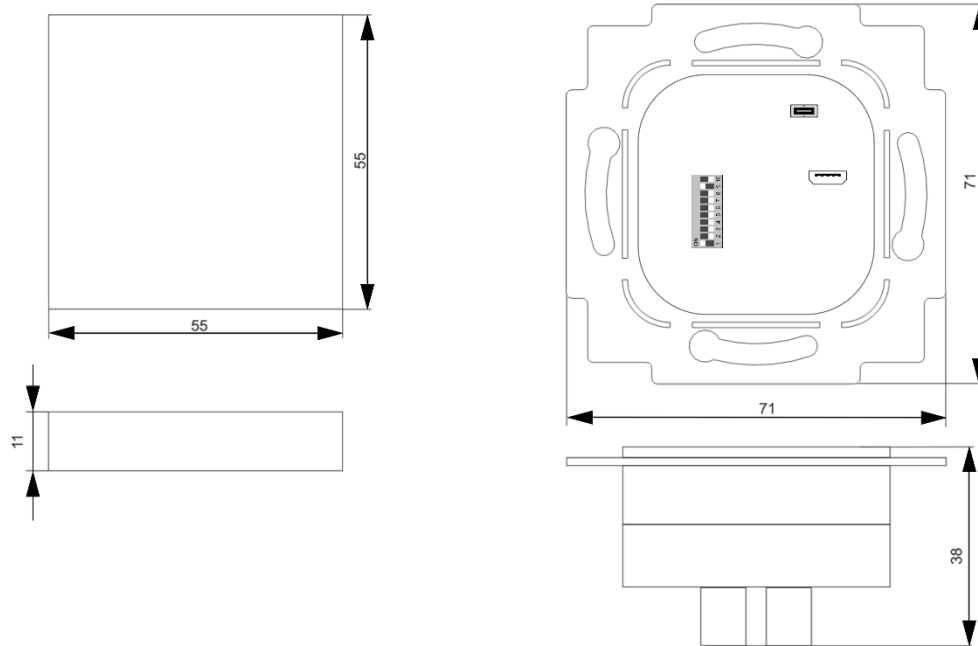
» ACCESSORIES (OPTIONAL)

Raw plugs and screws (2 pcs. each)	Item No.: 660945
USB RS485 Modbus RTU Logger	Item No.: 809917
USB Interface RS485 (incl. driver CD)	Item No.: 668293
RS485 Biasing Adapter	Item No.: 811378