

# WSA RS485 Modbus

Outdoor sensor for relative humidity and temperature

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

## Datasheet

Subject to technical alteration  
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### » APPLICATION

Protected temperature and humidity sensor for outside applications. The Radiation shield protects the outside sensors from rain and radiated heat. With the curved shape and color of the plates air flow is able to move across the sensors to keep radiated temperatures from rooftops and surrounding surfaces from affecting humidity readings.

### » TYPES AVAILABLE

**Weather protection - outdoor sensor temperature + humidity – active RS485 Modbus**

- WSA 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/wsa>

### » 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)

## » 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 ( $\pm 0,2$  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 term to loss of the specified accuracy:

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



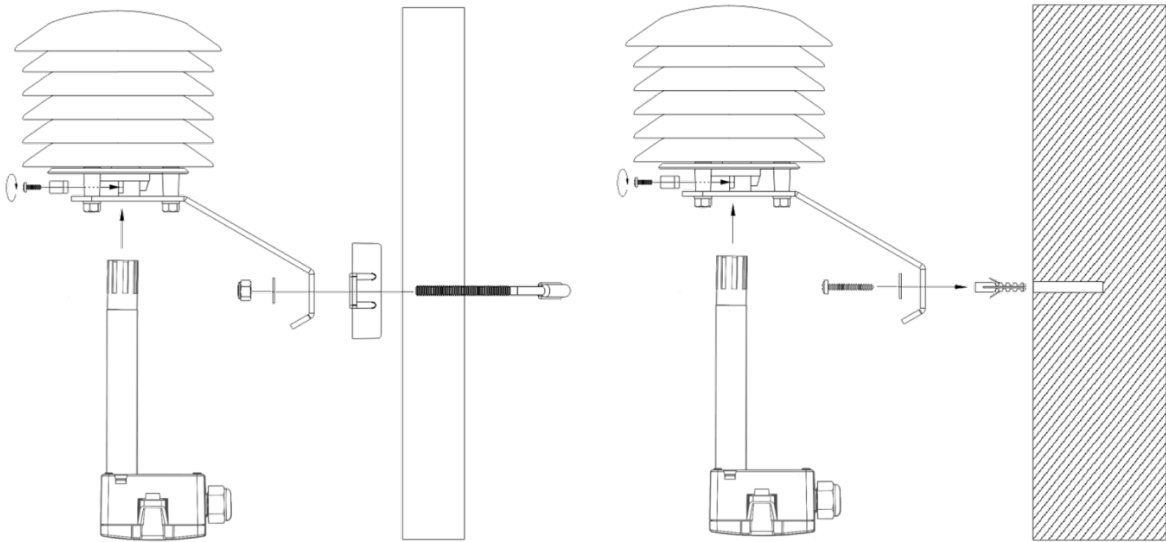
**Do not touch the sensor elements!**

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

## » TECHNICAL DATA

Measuring values	temperature, humidity (humidity output configurable)	
Output voltage	2x 0..10 V or 0..5 V, min. load 10 k $\Omega$ (live-zero configuration via Thermokon USEapp)	
Network technology	RS485 Modbus, RTU, half-duplex, baud rate 9.600, 19.200, 38.400 or 57600, parity: none (2 stopbits), even or odd (1 stopbit) <b>Fail-safe Biasing required</b>	
Power supply	15..35 V = or 19..29 V ~ SELV <i>With alternating voltage, the correct polarity must be ensured</i>	
Power consumption	max. 0,4 W (24 V =)   0,8 VA (24 V ~)	
Measuring range temp.	+40..+240 °F (default setting), optionally configurable via Thermokon USEapp	
Measuring range humidity	0..100% rH non-condensing, optionally configurable via Thermokon USEapp (enthalpy, absolute humidity, dew point)	
Accuracy temperature	$\pm 0,3$ K (typ. at 70 °F)	
Accuracy humidity	$\pm 2\%$ between 10..90% rH (typ. at 70 °F)	
Air speed	max. 40 ft./s	
Enclosure	enclosure USE-M, PC, pure white, with removable cable entry	
Protection	IP65 according to EN 60529	
Cable entry	M25 for cable max. $\varnothing=0.24$ in., seal insert for fourfold cable entry	
Connection electrical	<b>Mainboard</b> removable plug-in terminal, max. 2,5 mm <sup>2</sup>	<b>Plug-in card</b> removable plug-in terminal, max. 1,5 mm <sup>2</sup>
Pipe	PA6, black, $\varnothing=0.77$ in., length=5.5   10.6   15.75 in.	
Filter	stainless steel wire mesh	
Ambient condition	-4..+158 °F, short term condensation	
Mounting	wall mounting or on a mast tube	

» MOUNTING ADVICES



» USE ENCLOSURE WITH UV AND WEATHER RESISTANCE

After some time, outdoor mounted plastics can lose their color and quality. Therefore, all USE housings are made of special white polycarbonate (PC). The light-stable colorants and additives are used to achieve optimum protection of the polymer while maintaining color stability. The titanium dioxide used is specially developed for polycarbonate and offers excellent UV protection through the reflection of the entire light spectrum including the UV component by 340 nm. This effectively counteracts the otherwise occurring photochemical polymer degradation. The colors stay full for a long time without fading. The material is also resistant to cold and frost.

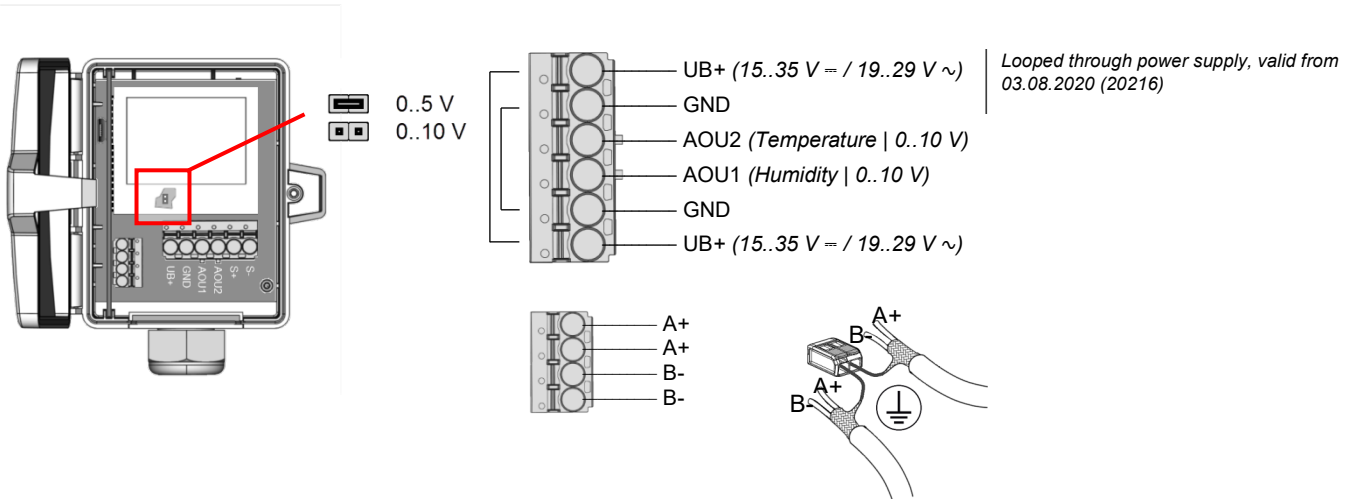
» APPLICATION NOTICE

After a certain time, dirt in the air can collect on the filter and then adversely affect the operation of the sensor. Under normal ambient condition an annual maintenance is recommended. Rinse the filter after cleaning with distilled water and dry it using clean oil-free air or nitrogen. Extremely contaminated filters should be replaced. At extreme ambient conditions, e.g. corrosive gases, the humidity sensor may have to be changed.

» CONNECTION PLAN

If the RS485 cable is looped through, connect both cable shields using the enclosed 2-pol. Connect terminal as shown.

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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 and all "negative" operating voltage input terminals (-) (=reference potential) are connected (in-phase connection of field devices). In the 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.

### » DIP SWITCHES, PLUG-IN CARD

The Modbus address of the device is set in the range of 1 ... 31 (binary encoded) using a 5-pole DIP switch. With address 0 via DIP, an extended address range (32..247) is available via USEapp.

\* factory default settings

**Termination 120 Ω**  
 Not active\*      active

**Baud**  
 9600\*      19200  
 38400      57600

**Modbus address**  
 ON=2<sup>0</sup> (1)\*    ON=2<sup>1</sup> (2)    ON=2<sup>2</sup> (4)    ON=2<sup>3</sup> (8)    ON=2<sup>4</sup> (16)

Sample address: 26

**Parity**  
 none\* (2-stopbits)    even (1-stopbit)    odd (1-stopbit)    none (1-stopbit)

Address	Access	Description	Resolution / Unit
1	R	relative humidity	0.1 %rF

Adress	Access	Description	Resolution / Unit					
			Register 400= 1			Register 400= 2		
0	R	Temperature	SI	0.1	°C	Imperial	0.1	°F
2	R	Absolute humidity	SI	0.01	g/m <sup>3</sup>	Imperial	0.01	Gr/ft <sup>3</sup>
3	R	Enthalpy	SI	0.1	kJ/kg	Imperial	0.1	BTU/lb
4	R	Dew point	SI	0.1	°C	Imperial	0.1	°F

Available measured values are type-dependent.



**Modbus addresses:**  
 USE-RS485 Modbus Interface  
 A detailed description of the Modbus addresses can be found under the following link: → [Download](#)

### » CONFIGURATION



The Thermokon bluetooth dongle with micro-USB (Item No.: 668262) is required for communication between USEapp and USE-M / USE L products. Commercial bluetooth dongles are not compatible.



Application-specific reconfiguration of the devices can be carried out using the Thermokon USEapp. The configuration is carried out in the voltage-supplied state.



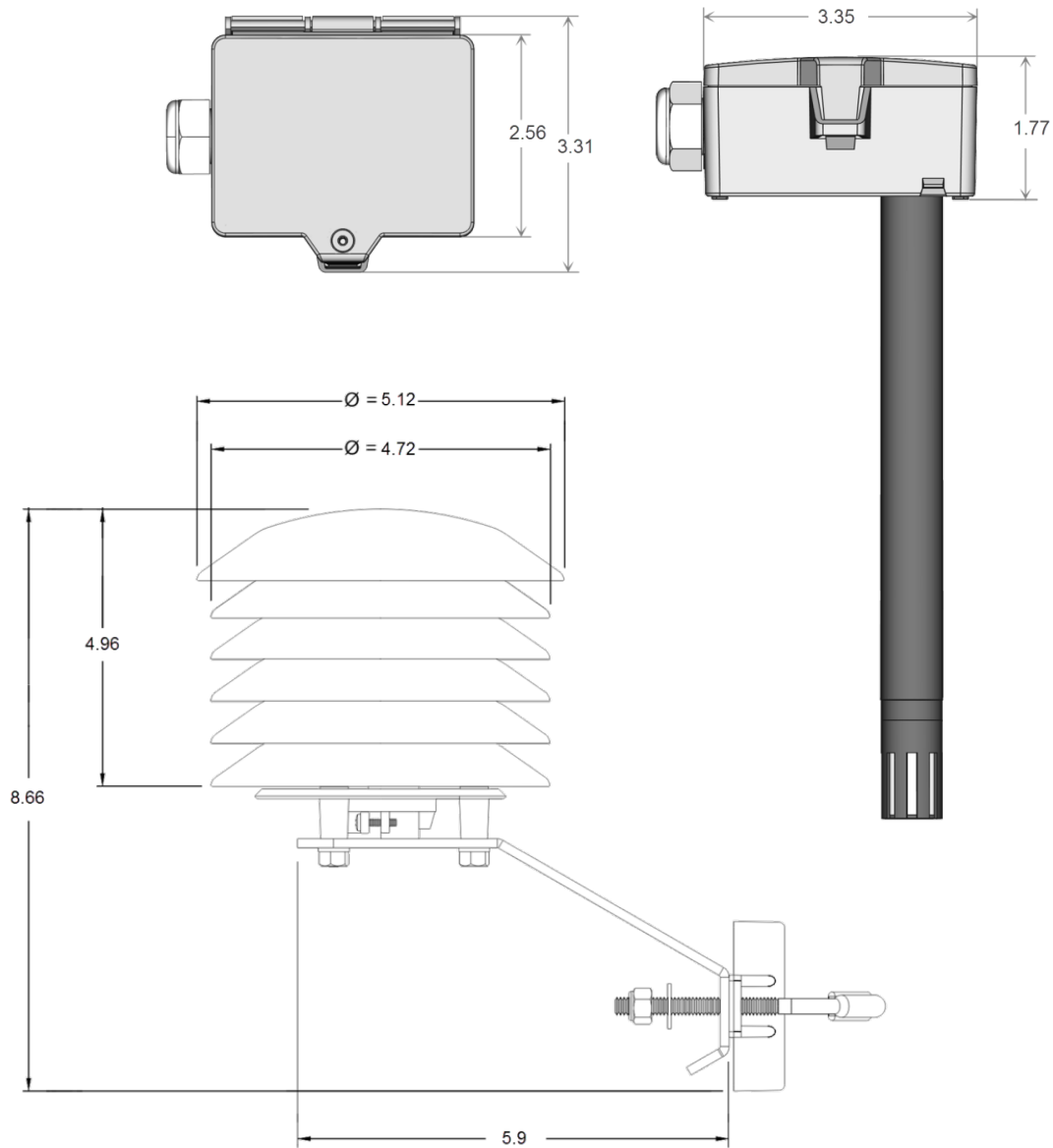
The configuration-app and the app description can be found in the Google Play Store or in the Apple App Store.

### » APPLICATION NOTICE



The Bluetooth dongle snaps into the socket easily. When removing, please fix the plug-in card (option PCB) so that it is not unintentionally pulled out.

## » DIMENSIONS (IN.)



## » ACCESSORIES (INCLUDED IN DELIVERY)

Mounting kit universal

Item No. 698511

• Cover screw + screw cover • 2 Rawlplugs • 2 Screws (countersunk head) • 2 Screws (rounded head)

## » ACCESSORIES (OPTIONAL)

Bluetooth dongle USE for USEapp

Item No. 668262

Mounting base

Item No. 631228

Filter stainless steel, wire mesh

Item No. 231169

RS485 Biasing Adapter

Item No. 811378

USB RS485 Modbus RTU Logger

Item No. 809917

USB Interface RS485 (incl. driver CD)

Item No. 668293