FTK+ Basic RS485 Modbus

Duct sensor for humidity and temperature

thermokon®
HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
Issue date: 10.10.2023 • A122

» APPLICATION

Duct humidity and temperature sensor in new hinged lid enclosure USE-S for all HVAC duct applications. Designed for control and monitoring applications.

» TYPES AVAILABLE

Duct humidity sensor temperature + humidity – active BUS

- FTK + Basic RS485 Modbus <xxx> VV incl. MF20 (TPO)

» PRODUCT TESTING AND CERTIFICATION

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

» 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.

» 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.

» TECHNICAL DATA

Measuring values	temperature, humidity
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	max. 0,7 W (24 V =) | 1,8 VA (24 V ~) SELV
Measuring range temp	-20..+80 °C
Measuring range humidity	0..100% rH non-condensing
Accuracy temperature	±0,3 K (typ. at 21 °C)
Accuracy humidity	±2% between 10..90% rH (typ. at 70 °F)
Air speed	max. 12 m/s
Enclosure	enclosure USE-S, PC, pure white
Protection	**enclosure** IP65 according to EN 60529
Cable entry	Flextherm M20, for wire Ø=4,5..9 mm, removable
Connection electrical	removable plug-in terminal, max. 2,5 mm²
Pipe	PA6, black, Ø=19,5 mm, length=140 | 270 | 400 mm
Ambient condition	-20..+70 °C, short term condensation

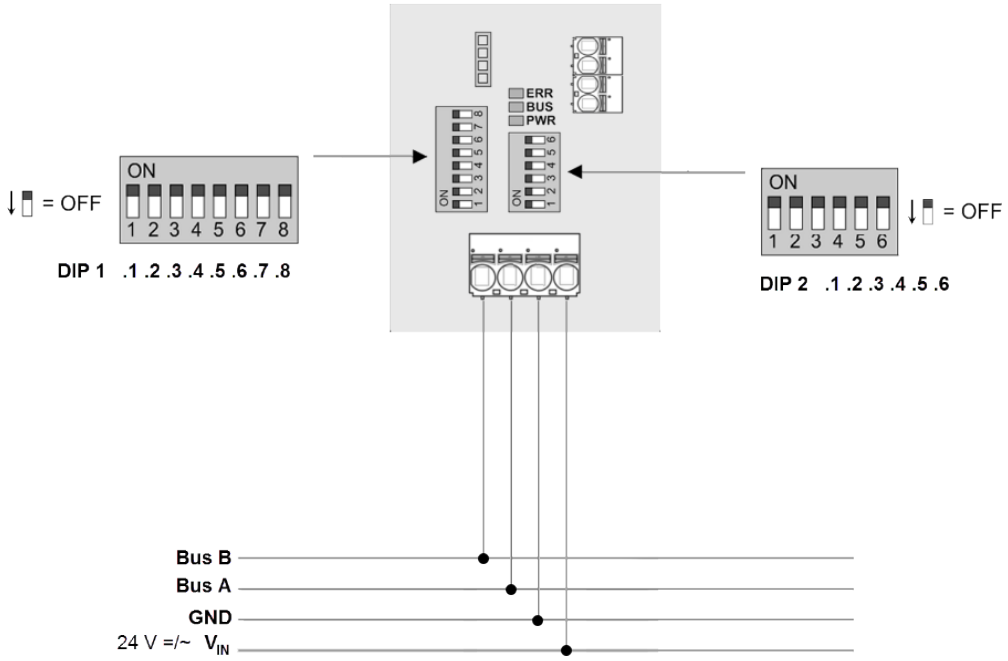
***Power supply**

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.

»CONNECTION PLAN AND CONFIGURATION



LED	Description
ERR	Indicator for error notification
BUS	Indicator for RS485 traffic
PWR	Power supply

Device Address (binary coded)

DIP 1.1	DIP 1.2	DIP 1.3	DIP 1.4	DIP 1.5	DIP 1.6	DIP 1.7	DIP 1.8	Address
2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^7	
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1
OFF	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	2
ON	**ON**	OFF	OFF	OFF	OFF	OFF	OFF	3
								…
ON	ON	ON	ON	ON	ON	ON	ON	247

Modbus interface settings

DIP 2.1	Mode	DIP 2.2	DIP 2.3	Baud	DIP 2.4	DIP 2.5	Parity	DIP 2.6	Register
OFF	RTU	OFF	OFF	9.600	ON	OFF	even	OFF	UNI
ON	ASCII	**ON**	OFF	19.200	OFF	ON	odd	**ON**	USE
		OFF	**ON**	38.400	OFF	OFF	none (2 Stopbits)		
		ON	**ON**	57.600	ON	ON	none (1 Stopbit)		

Factory default
Device address: 1 | RTU | Baud rate: 9.600 | Parity: even | Register addressing: USE

Register compatibility to USE (Valid from firmware version 1.4, Jan. 2020)

Via dipswitch 2.6 it is possible to change between the previous register addressing of the UNI-Modbus board to a USE compatible register assignment. The function of the device does not change.

When using ASCII mode, parity must be set to EVEN or ODD. „No Parity“ (no) is not available in ASCII mode.

»RS485 MODBUS REGISTER

Variant 1 (UNI-Modbus) DIP 2.6 = *OFF*

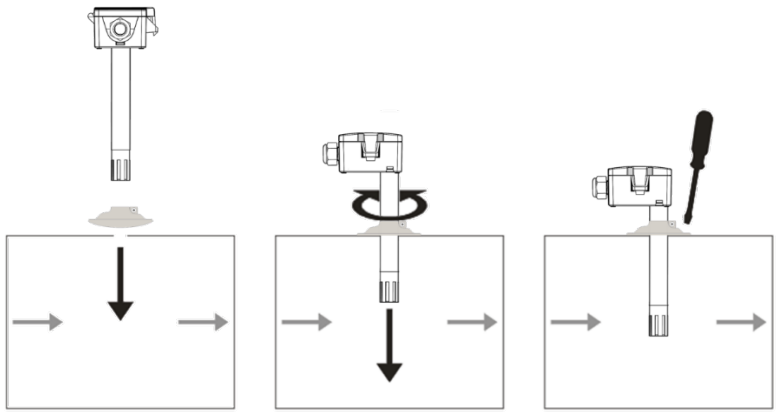
Data address	Function code	Description	Type
0_{dec} $0x0000_{hex}$	3 (R)	Firmware z.B.: 0x1000 = Version 1.0.0.0	SIGNED 16 Bit
1_{dec} $0x0001_{hex}$	4 (R/W)	Device Location	SIGNED 16 Bit
585_{dec} $0x0249_{hex}$	3 (R)	Relative humidity [1/10] %	SIGNED 16 Bit
587_{dec} $0x024B_{hex}$	3 (R)	Temperature [1/100] °C	SIGNED 16 Bit
588_{dec} $0x024C_{hex}$	3 (R)	Temperature [1/100] °F	SIGNED 16 Bit
5_{dec} $0x0005_{hex}$	4 (R/W)	Offset temperature [1/100] K	SIGNED 16 Bit
6_{dec} $0x0006_{hex}$	4 (R/W)	Offset rel. humidity [1/100] %	SIGNED 16 Bit

Variant 2 (USE-Modbus) DIP 2.6 = ON

Data address	Function code	Description	Type
503_{dec} | $0x01F7_{hex}$	3 (R)	Firmware version i.e.: 0x1300 = Version 1.3.0.0	SIGNED 16 Bit
400_{dec} | $0x0190_{hex}$	4 (R/W)	Unit system 1 = SI 2 = Imperial	SIGNED 16 Bit
0_{dec} | $0x0000_{hex}$	3 (R)	Temperature [1/10] °C/°F	SIGNED 16 Bit
1_{dec} | $0x0001_{hex}$	3 (R)	Relative humidity [1/10] %rH	SIGNED 16 Bit
100_{dec} | $0x0100_{hex}$	4 (R/W)	Offset temperature [1/10] K	SIGNED 16 Bit
101_{dec} | $0x0101_{he}$	4 (R/W)	Offset rel. humidity [1/10] %rH	SIGNED 16 Bit

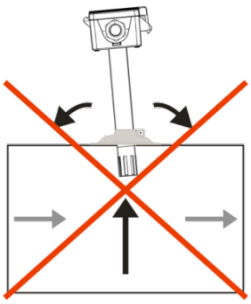
»MOUNTING ADVICES

The sensor can be mounted into the ventilation duct with the mounting flange MF20 TPO. For risk of condensate permeation the pipe must be installed in a position that occurred condensate can run off.



»DISMOUNTING ADVICES

Remove the lower section of the sensor carefully and pulling straight out. **Pay close attention to the correct dismantling of the component!**



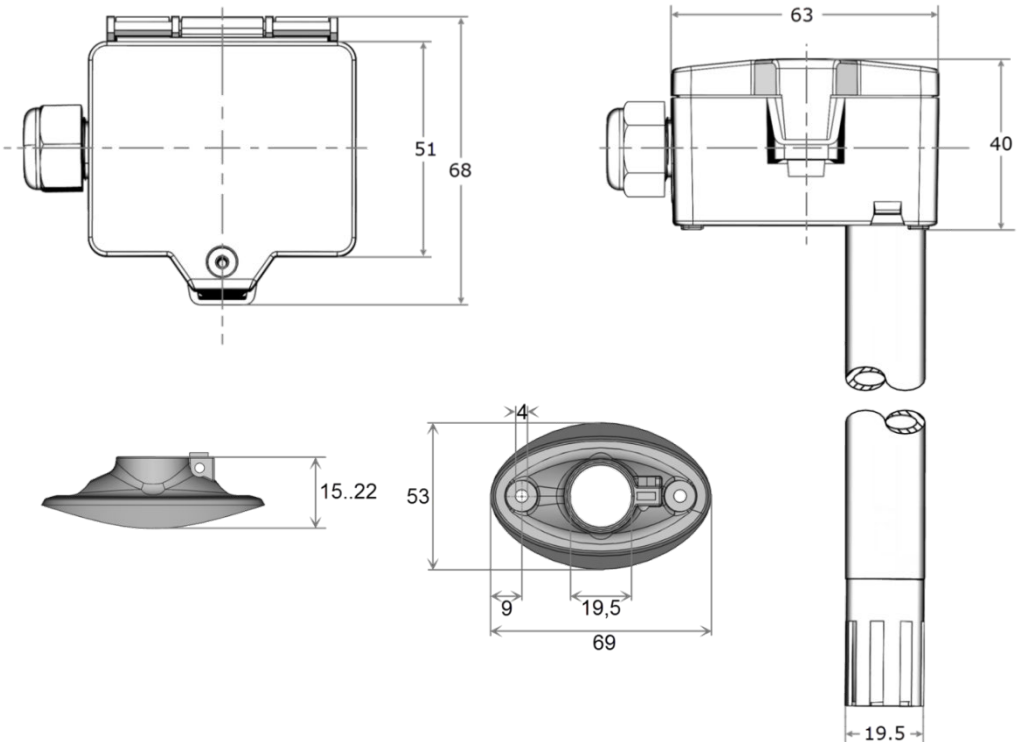
»USE ENCLOSURE WITH UV AND WEATHER RESISTANCE

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.

»DIMENSIONS (MM)



»ACCESSORIES (INCLUDED IN DELIVERY)

Mounting flange MF20 TPO	Item No. 612562
Mounting kit universal	Item No. 698511

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

»ACCESSORIES (OPTIONAL)

Filter stainless steel, wire mesh (spare part)	Item No. 231169
Rawlplugs and screws (2 pcs each)	Item No. 102209
Weather protection for FTK, FTK+, WSA (replacement)	Item No. 625241
Sealing insert M20 USE white, 2x Ø=7 mm (for 2 wire; PU 10 pieces)	Item No. 641333