MWF400+ (LCD) RS485 Modbus

Average temperature sensor

HOME OF SENSOR TECHNOLOGY

Datasheet

Subject to technical alteration
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The following illustrations show the version with LCD

» APPLICATION

Duct averaging temperature sensor in enclosure USE-M for measuring the average temperature in air ducts. The sensor detects the applied temperature value throughout the entire length.

» TYPES AVAILABLE

Duct averaging sensor optional with Display temperature – active RS485 Modbus
- MWF400+ (LCD) 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

CE

Declaration of conformity
The declaration of conformity of the products are available on our website
https://www.thermokon.de/direct/en-gb/categories/mwf400plus

» 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

» 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.

» 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.

» TECHNICAL DATA

Measuring values	temperature
Output voltage	0..10 V or 0..5 V, min. load 10kΩ (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)
Power supply	15..35 V = or 19..29 V ~ SELV *With alternating voltage, the correct polarity must be ensured*
Power consumption	max. 2,3 W (24 V =) | max. 4,3 VA (24 V ~)
Output signal range temp. *Scaling analogue output*	+40..+240 °F (default setting), selectable from 8 temperature ranges-30..+130 | 0..+250 | +40..+140 | 0..+150 | +30..+480 | 0..+100 | +40..+240 | +40..+90 °F, optionally configurable via Thermokon USEapp
Operating temperature range ** Max. permissible operating temp*	**sensor rod** -22..+176 °F	**enclosure** -4..+158 °F (with LCD) -31..+158 °F (w/o LCD)	**mounting base** -31..+194 °C
Accuracy temperature	±0,5 K (typ. at 70 °F)
Display *(optional)*	LCD 1.14x1.38 in. with RGB backlight
Enclosure *(type-dependent)*	enclosure USE-M, PC, pure white, cover PC, with LCD transparent, with removable cable entry
Protection	IP65 according to EN 60529
Cable entry	M25, for wire max. Ø=0.28 in., seal insert for fourfold cable entry
Connection electrical	**Mainboard** removable plug-in terminal, max. 14AWG	**Plug-in card** removable plug-in terminal, max. 16AWG
Sensor rod	copper, Ø=0.16 in., mounting length: 1.3 ft. sensor neck stainless steel V4A Ø=0.24 in.
Ambient condition	*max. 85% rH short term condensation*

» MOUNTING ADVICES

The sensor can be mounted to the ventilation duct by means of the mounting clip. During the installation, observe that the bending radius of the sensor rod has to be no smaller than 1.38 in.. **Note: Please pay attention to the sensor rod while mounting and protect it from mechanical damage!**
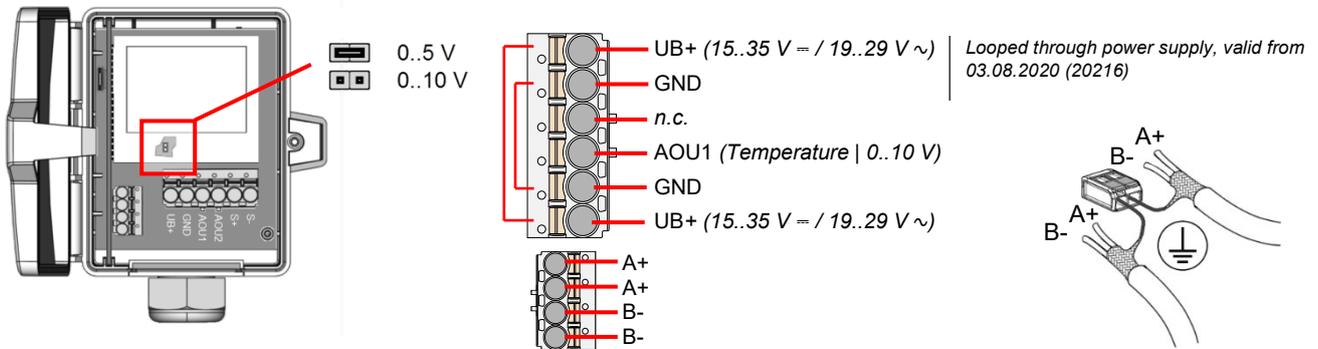
»CONNECTION PLAN

To change the output voltage range (default 0..10 V to 0..5 V) via jumper, the display must be removed from the board first. If the RS485 cable is looped through, connect both cable shields using the enclosed 2-pol. Connect terminal as shown.

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 my cause damage to it. Therefore, pay attention to correct wiring.

MWF+ (LCD) RS485

0..5 V
0..10 V

UB+ *(15..35 V ⎓ / 19..29 V ∼)*
GND
n.c.
AOU1 *(Temperature | 0..10 V)*
GND
UB+ *(15..35 V ⎓ / 19..29 V ∼)*

A+
A+
B-
B-

Looped through power supply, valid from 03.08.2020 (20216)

A+
B-
A+
B-

»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.

Termination 120 Ω

Not active* ・ active

Baud

9600* ・ 19200

38400 ・ 57600

Modbus adress

ON=2^0 (1)* ・ ON=2^1 (2) ・ ON=2^2 (4) ・ ON=2^3 (8) ・ ON=2^4 (16)

Sample adress: 26

Parity

none* (2-stopbits) ・ even (1-stopbit) ・ odd (1-stopbit) ・ none (1-stopbit)

* factory default settings

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

			Register 400 = 1 (Unit SI)			Register 400 = 2 (Unit Imperial)		
Address	Access	Description	Resolution / Unit			Resolution / Unit		
0	R	Temperature	SI	0.1	°C	Imperial	0.1	°F

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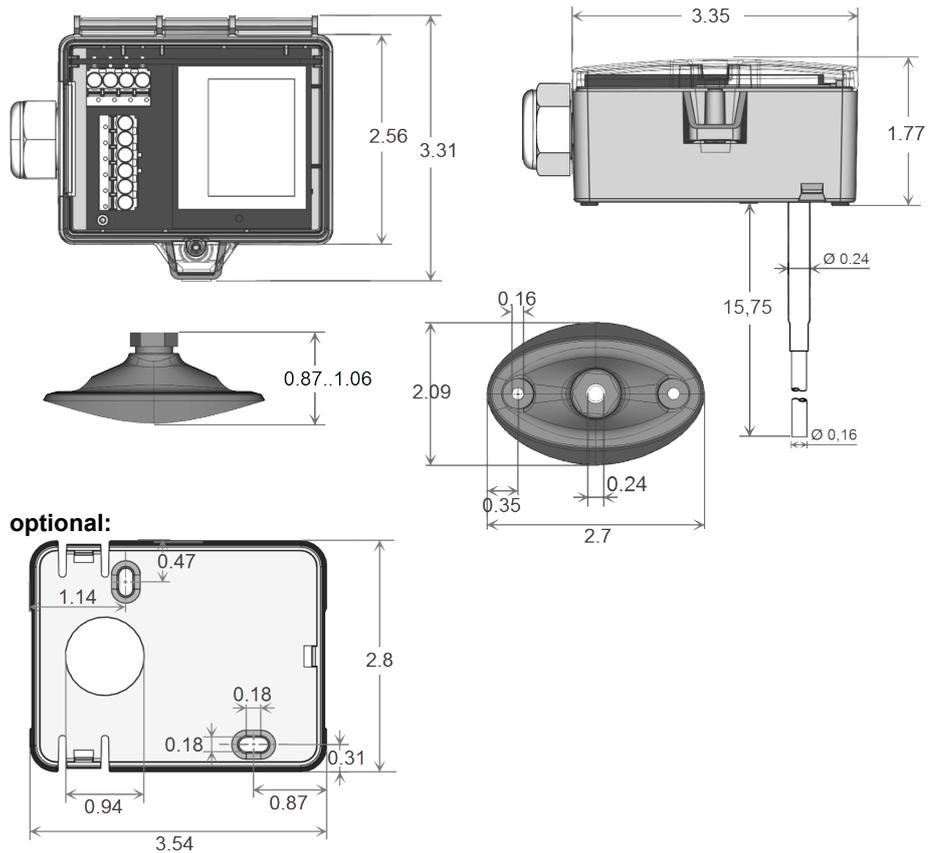
The configuration-app and the app description can be found in the Google Play Store or in the Apple App Store.

»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.)

optional:

» ACCESSORIES (INCLUDED IN DELIVERY)

Mounting flange MF6DS	Item No. 669016
Mounting kit universal	Item No. 698511
• Cover screw + screw cover• 2 Rawlplugs • 2 Screws (countersunk head) • 2 Screws (rounded head)	

» ACCESSORIES (OPTIONAL)

Mounting base	Item No. 631228
Bluetooth dongle	Item No. 668262
RS485 Biasing Adapter	Item No. 811378
USB RS485 Modbus RTU Logger	Item No. 809917
Converter RS485 Modbus-USB incl. driver CD	Item No. 668293