

# AKF10+

Duct-/Immersion temperature sensor

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

## Datasheet

Subject to technical alteration  
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### » APPLICATION

Duct/Immersion sensor for measurement of air temperature and other gaseous mediums for HVAC applications (e.g. supply and exhaust ducts). Can be used as an immersion temperature sensor combined with a thermowell pocket.

### » TYPES AVAILABLE

#### Duct/Immersion sensor temperature – passive

- AKF10+ <sensor> <xxx>.0x

#### Duct/Immersion sensor temperature – active TRV 0..10 V | TRA 4..20 mA

- AKF10+ TRV MultiRange <xxx>.06
- AKF10+ TRA MultiRange <xxx>.06

<sensor>: PT100/PT1000/NI1000/NI1000TK5000/LM235Z/NTC.../PTC... other sensors on request

<xxx>: mounting length 50/100/150/200/250/300/450 mm

0x: .06 = Pocket Ø 6 mm/ .04 = Pocket Ø 4 mm

MultiRange: Measuring ranges adjustable at the transducer

### » 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/>.

### » 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.

## » GENERAL REMARKS CONCERNING SENSORS

Especially with regard to passive sensors in 2-wire conductor versions, the wire resistance of the supply wire has to be considered. If necessary the wire resistance has to be compensated by the follow-up electronics. Due to self-heating, the wire current affects the measurement accuracy, so it should not exceed 1 mA.

When using lengthy connection wires (depending on the cross section used) the measuring result might be falsified due to a voltage drop at the common GND-wire (caused by the voltage current and the line resistance). In this case, 2 GND-wires must be wired to the sensor - one for supply voltage and one for the measuring current.

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 ( $\pm 0,2$  V). When switching the supply voltage on/off, onsite power surges must be avoided.

## » 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.**

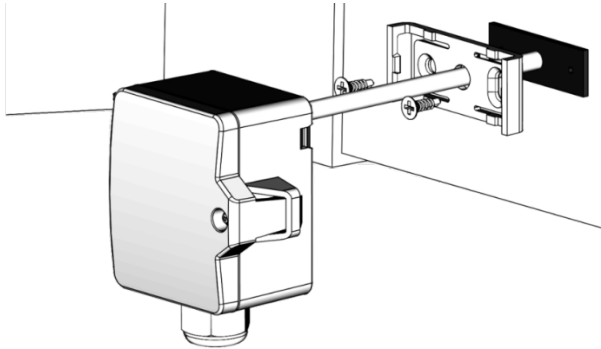
## » TECHNICAL DATA

Measuring values	temperature			
Output voltage	TRV 1x 0..10 V or 0..5 V, configurable via jumper, min. load 5 k $\Omega$			
Output ampere	TRA 1x 4..20 mA, max. load 500 $\Omega$			
Output passive	<b>passive</b> optional, PT100/PT1000/NI1000/NI1000TK5000/LM235Z/NTC.../PTC... other sensors on request			
Power supply	TRV 15..24 V = ( $\pm 10\%$ ) or 24 V ~ ( $\pm 10\%$ ) SELV	TRA 15..24 V = ( $\pm 10\%$ ) SELV		
Power consumption	TRV typ. 0,4 W (24 V =)   0,8 VA (24 V ~)	TRA typ. 0,5 W (24 V =)		
Measuring range temp.	<b>passive</b> -50..+ 120 +150 +160 °C, depending on used sensor			
Output signal range temp. <i>*Scaling analogue output</i>	TRV   TRA default setting: 0..+160 °C selectable from 8 temperature ranges -50..+50   -20..+80   -15..+35   -10..+120   0..+50   0..+100   0..+160   0..+250 °C, adjustable at the transducer			
Operating temperature range <i>* Max. permissible operating temperature</i>	<b>sensor pocket</b> -50..+160 °C optional -80..+260 °C	<b>electronic – TRV TRA</b> -35..+70 °C	<b>electronic – passive</b> -35..+90 °C	<b>mounting clip   base</b> -35..+90 °C
Accuracy temperature	TRV   TRA $\pm 0,5$ K (typ. at 21 °C within default measuring range)		<b>passive</b> typ. $\pm 0,3$ K (typ. at 21 °C), depending on used sensor	
Sensor	<b>passive</b> 2-wire (default), 3-wire or 4-wire			
Enclosure	enclosure USE-S, PC, pure white, UV resistant			
Protection	IP65 according to EN 60529, SI-Protection			
Cable entry	Flextherm M20, for wire $\varnothing=4,5..9$ mm, removable			
Connection electrical	removable plug-in terminal, max. 2,5 mm <sup>2</sup>			
Pocket	stainless steel V4A, $\varnothing=6$ mm, optional $\varnothing=4$ mm , mounting length: 50   100   150   200   250   300   450 mm			
Ambient condition	max. 85% rH short term condensation			
Mounting	with duct temperature of +90..120 °C mounting flange MF6 flexible, at +120..260 °C mounting flange MF6 (brass) is recommended			

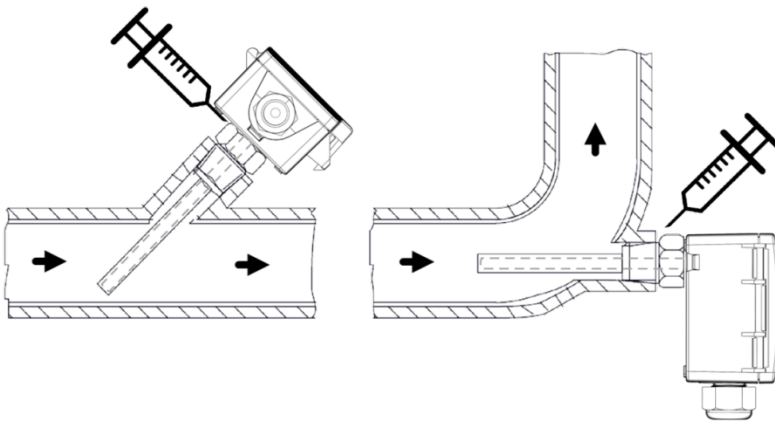
» **USE ENCLOSURE WITH UV AND WEATHER RESISTANCE**

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.

» **MOUNTING ADVICES**



The sensor can be mounted on the ventilation duct by means of the mounting clip. For risk of condensate permeation in the sensor tube respectively in the immersion pocket the bushing must be installed in a position that occurred condensate can run off.

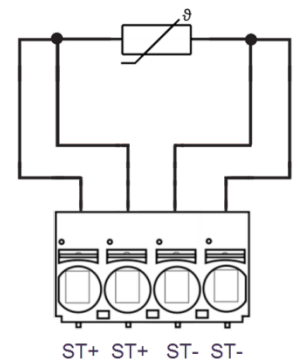
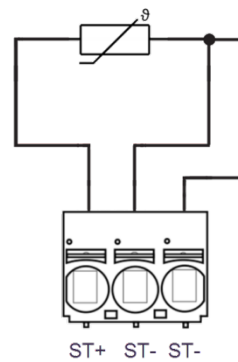
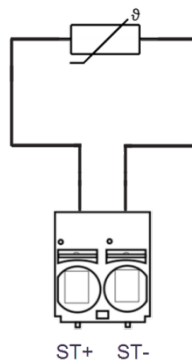
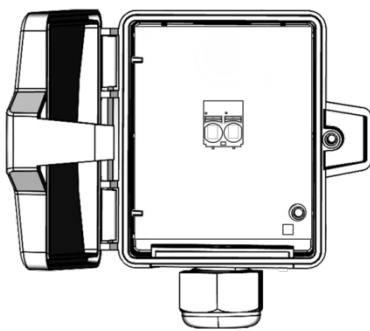


Mounting with immersion pocket or compression fitting for usage in liquid media. Use contact fluid for better heat transfer between sensor and measuring medium.

» **CONNECTION PLAN AND CONFIGURATION**

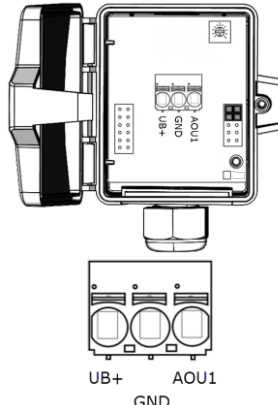
The adjustment of the measuring ranges is made by changing the jumpers in a de-energized state. The output value of the new measuring range is available after 2 seconds. Jumper 2 has no function for type TRA.

**Passive**



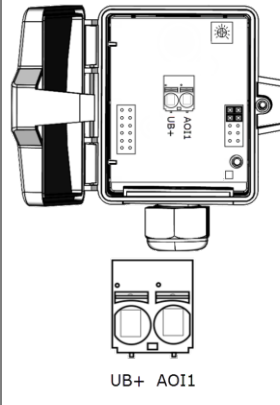
**Active**

**TRV**  
0..10V | 0..5V



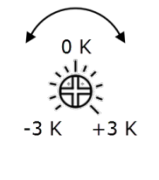
UB+    AOU1  
GND

**TRA**  
4..20mA



UB+    AO11


**Temperature Offset**



0 K  
-3 K    +3 K

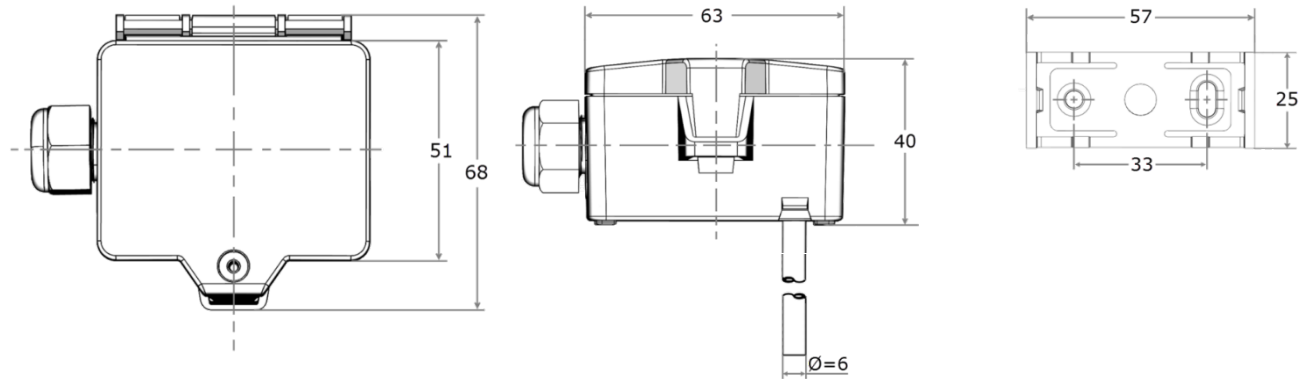
**Jumper**  
1-5

1		°C		°F (more info below)	
2		0..10V		0..5 V <i>TRV only</i>	
3		-50 °C..+50°C	3		0°C..+100°C
4			4		-20°C..+80°C
5		-10°C..+120°C	3		0°C..+250°C
4			4		-20°C..+80°C
3		0°C..+50°C	3		0°C..+250°C
4			4		0°C..+250°C
5		-15°C..+35°C	3		0°C..+160°C
4			4		0°C..+160°C
5			5		



EN-US datasheet with more information regarding °F

**» DIMENSIONS (MM)**



**» ACCESSORIES (INCLUDED IN DELIVERY)**

Mounting kit AKF10+  
 • Cover screw + screw cover • 2 Screws • mounting clip + self-adhesive seal

Item No. 748551

**» ACCESSORIES (OPTIONAL)**

VA-Compression fitting type KL6VA (suitable for 6 mm)  
 Mounting base enclosure USE pure white  
 Mounting flange MF6 flexible (suitable for Ø=4 | 6 | 7 mm)  
 Mounting flange MF6, brass (suitable for Ø=6 mm)  
 Syringe thermal contact fluid  
 Sealing insert M20 USE white, 2x Ø=7 mm (for 2 wire; PU 10 pieces)

Item No. 103213  
 Item No. 667722  
 Item No. 399098  
 Item No. 003407  
 Item No. 102308  
 Item No. 641333

**Thermowell pockets stainless steel / brass for sensors with pocket Ø=6 mm**

length	50 mm	100 mm	150 mm	200 mm	250 mm	300 mm	450 mm
THMSDS	610995	611008	611015	611022	611763	611039	611046
THVADS	611152	611817	611824	611848	611862	611879	611893

MS-thermowell pocket (brass, suitable up to 16 bar) type THMSDS <xx>.  
 VA-thermowell pocket (stainless steel, suitable up to 40 bar) type THVADS <xx>.