TiTEC®
SENSORIK NACH MAß

PRODUCT OVERVIEW
BUILDING SERVICES ENGINEERING
ISSUE 016/2017

MADE IN GERMANY

WE ARE MANUFACTURER

3 YEARS WARRANTY

www.titec-gmbh.de

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"

The statisfaction of our customers is TiTEC®'s top priority. The continuous development of our products and services gives you head start in-front of the competition.
We are a reliable partner at your side - at all times.

Only those who try to become better with each day will be able to remain the best.

"

- Oliver Tomasev

MEASUREMENTS TECHNOLOGY FROM THE BLACK FOREST

Highly precise solutions for various markets - made in Germany

with over 25 years of experience, TiTEC® Temperaturmesstechnik GmbH (located in Bräunlingen and Donaueschingen/Germany) is one of the most renowned companies in the field of Measurements and sensor technology.

We develop and produce high-guality temperature, pressure, CO2, mixed gas, motion, light, flow and humidity Measurements gauges for the national and international market and multiple areas of application.

This includes the fields of building services engineering, building automation as well as industrial and laboratory applications.
Our range of performance is completed by the fields of pressure and CO2 sensor technology, developing, producing and marketing in-house components

FAST AND STRAIGHT-FORWARD CONSULTING!

Just give us a call:

+49 (0) 771 15 89 30 - 0

Visit us at:

www.titec-gmbh.de

YOUR ADVANTAGES:

TiTEC ® will help you to compete within the market

1. IN-HOUSE PRODUCTION
2. COMPETENT CONSULTING
3. FIRST-CLASS QUALITY
4. CUSTOM SOLUTIONS
5. 25 YEARS OF KNOW-HOW
6. FAST DELIVERY

THE DIFFERENCE: HIGHEST EFFICIENCY, FLEXIBILITY AND SPEED THANKS TO OUR IN-HOUSE PRODUCTION

Unlike most other providers, we are not purchasing from the segments of temperature, humidity, air-quality, motion/light, pressure and flow Measurements, but are producing our very own products - and we do so with excellent know-how, modern machinery, a high in-house production depth and strong flexibility.

Everything from small batch series, high volume production up to OEM components - all production processes are carried out autonomously by TiTEC®.

That's why we are able to fulfil nearly every customer request. - Fast, accurate and economic.

In pratice, this means the following: No matter if it's about getting the most precise Measurementss, proven and highly efficient product quality or self-evident services such as adherence to schedules - TiTEC® delivers on time and exactly what you need. And this is what makes the difference in a steadily growing competeive market.

WE LEAVE NOTHING TO CHANCE:

CONSTRUCTION - TURNING & MILLING - WELDERING

LASERING - ASSEMBLY - CONFECTIONING - LABELLING

DISTRIBUTION - THIS IS TITEC®!

IN-HOUSE PRODUCTION STRAIGHT FROM THE MANUFACTURER

OUR GOAL...

...is to offer you the best solution while reducing energy consumption. A further important point: Completing our building automation projects economically.

In order to give you a financial advantage in the highly competitive building industry, we have been developing and producing our electrical components such as mesurement transducers for temperature, humidity, air quality, motion/light,

FASTER THANKS TO OUR KNOW-HOW

TiTEC®'s experience helps to get your project up to speed. Because we don't only what we are talking about, but what YOU are talking about.
We are able to comprehend your wishes in no time and swiftly put them into practice. This is where our in-house production comes into play: Since we produce entirely independent of external partners, we are able to offer short delivery times, which is a great advantage in today's highly dynamic globalized market environment.

GERMAN QUALITY FROM IN-HOUSE PRODUCTION

Traditional, accurate and dedicated

TiTEC® Temperaturmesstechnik GmbH develops and produces temperature sensors for industrial, laboratory, scientific and building engineering applications for the entire European market at the facilities in Bräunlingen and Donaueschingen. Quality made in Germany!

Everything from small batch series, high volume production up to OEM components - all production processes are carried out autonomously by TiTEC®.

MADE IN SCHWARZWALD

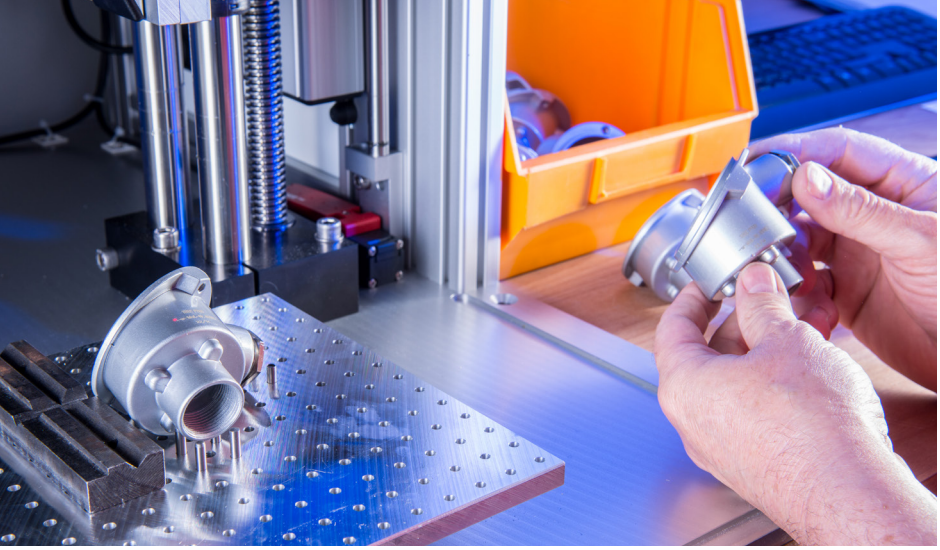
When it comes to production, we leave nothing to chance. Our company-owned state-of-the-art production combines innovation and our acquired competence in the fields of electronics and mechanics. All production processes at TITEC are topped off by our 100 percent final inspection.

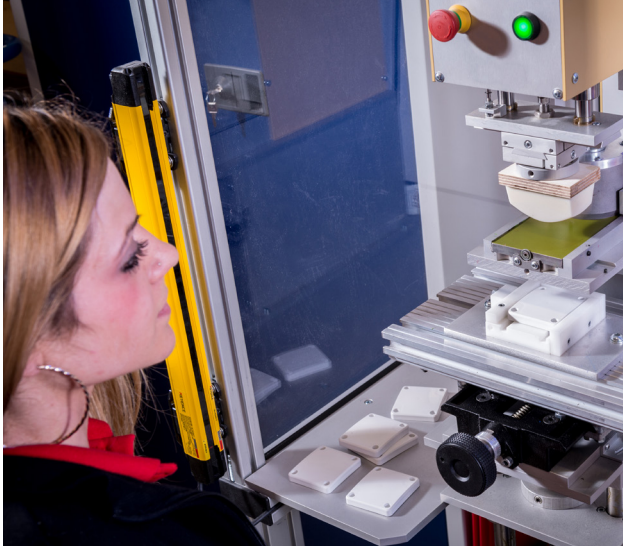
OVER 25 YEARS OF KNOW-HOW

TiTEC® employs skilled professionals who know what matters. More than a quarter century of experience in the field of sensor technology speaks for itself. We know exactly how to implement our knowledge in order to satisfy our customers.

CUSTOMER-SPECIFIC DELIVERY

We have all types of standard products at our disposal and are able to guarantee short delivery times. On the other hand, we distinguish ourselves by our high in-house production depth.





TiTEC®
SENSORIK NACH MAß

3 YEAR WARRANTY

Our 3 year warranty offers additional security.
We make use of high-quality material such as high-alloy stainless steel, aluminum, brass, Inconel, Hastelloy, plastics and many more.

LABELING SERVICE

The products you order can be labelled with your individual company logo/article desciription via pad printing or laser labelling.

OUR CALIBRATION SERVICE

We are able to issue WKS, ISO and DKD certificates on demand.
Calibration certificates (WKS certificates for Germany): The calibration can be traced back to a norm officially recognized (in Germany) and is e.g. pplicable for the documentation of single Measurements points, in-house sensor documentation or accuracy certifications.
ISO certificates: fulfil the requirements of ISO 9000:2015, ISO 10012:2004-03, VDA, ISO TS 16949:2010-05.
DKD-certificates: certifications of the German Calibration Services): suited for factory and working standards (authorized experts, pharmaceutical norms, test laboratory norms)

LONGTIME EXPERIENCE

1992 The way the company was established by Slobodan Tomasev alomst reminds of a classical success story of a modern company: Gas analysis probes and temperature sensors are being produced in a garage and sold on-premise.

1994 Premises with an overall space of 100 m2 are rented, the production is expanded by adding turned and milled parts used for temperature Measurements to the portfolio.

1996 The production area is expanded to 250 m^2.

2000 The new buildling with a plot space of 1200 m2 is taken into commission for the first time. The machinery is complemented by various laser and welding machines as well as machines for turning and milling. By now the Company has 10 employees

2003 The company TiTEC® Temperaturmesstechnik GmbH is established by Oliver Tomasev. The company specializes in developing and manufacturing Measurements products.

CUSTOM SOLUTIONS TO YOUR ADVANTA
IN A COMPETETIVE ENVIRONMENT.

2007 Thermotec is integrated into TiTEC® Temperaturmesstechnik GmbH. An addition- 2007 al production area with an overall space of 500 m2 is taken into operation.

2009 The merchandise planning and control system SAP is introduced

2010 TiTEC® Temperaturmesstechnik GmbH becomes an official registered brand

2011 A new building with a plot area of 6000 m^2 is under construction.

2012 The new building is taken into operation, the office, warehouse and production space is 2012 now around 3,000 m^2 large. Number of employees: 45. The electronics department takes first pick-and-place machines.

2013 A new construction area with 3,000 m^2 is being planned for Factory 1. Oliver Tomasev takes over the company shares of Slobodan Tomasev.

2015 Marketlaunch of the new TiTec-Indoor-Sensor Casing. Enlargement of company through the launch of new manufacturing areals in the electrical manufactory focused on the ESD-Sector.
Focused europeen market penetration thanks to new exclusive cooperation partners in Netherlands/ Finnland/Luxembourg/Greece/Spain/Turkey

2016 Rollout of new the new TiTec Unviersal Casing. Enlargement of portfolio by MODBUS-protocol integration in our standard active measuring instruments and the new combinated-room-control-devices.

FROM IDEA TO PRODUCT
WE KNOW WHAT IT MEANS TO DELIVER FULL SERVICE

Every operational area, every application and every customer comes with differing specific demands. No matter what you require or wish for: the specialists at TiTEC are a creative and reliable partner right from the start.

From the first idea over the drawings to the first prototype, from the pilot and small series production to large-volume production - with the help of our full service program we'll help you all the way to find the best technical and econmical solution.

REQUIREMENT

We will start to develop the first practical ideas as a basis for a goal-oriented consultation as soon as we receive your request.

CONSULTATION

We are leading the way to the best technical and economical solution for your Measurements task.

OFFER

Price guarantee thanks to transparency: We will establish a detailed offer which you can count on.

Visit us at:
www.titec-gmbh.de

DEVELOPMENT

Our strength:
Technical creativity.
The result:
Customer-specific products meeting all requirements - for all sensor technology measurement sizes.

SAMPLING

Refinement and goal-oriented optimization of the prototypes designed by TiTEC up to sample approval.

PRODUCTION

Highly precise production in our inhouse production - individual possibilites thanks to pad printing, laser labelling, labelling and printed packages.

Just give us a call:
+49 (0) 771 15 89 30 - 0

NEW PRODUCTS:

We are always developing new and innovative products in order to fulfill our customers' demands.

Below you will find an overview of the newest TiTEC® products.

DIN-RAIL MEASURING TRANSDUCER FOR PT1000 - MUF-HS

Our measuring transducer MUF-HS records the temperature via a connected Pt1000 sensor and coverts the value into a standardized analogue output signal in the range between 0-10V/4-20 mA.

Details on PAGE 59.

STAINLESS STEEL IMMERSION SLEEVE THVA3 WELDED, WITH G1/2" INSIDE-AND-CONNECTIVE THREAD

Our new Immersion sleeves are optimally suitable for Screw-In sensors with G1/2" thread socket. The Immersion sleeve is made of stainless steel, what marks it specialy for the use in agressive media fields.

Details on PAGE 60

LEAK SENSOR

Our LGM reliably detects conductive liquids which is making it ideal for monitoring leakage and moisture content. The Main applications are in the building and climate technology.

Details on PAGE 105

STEVENSON SCREEN

There exist various fields of application of our weather shelter in home and building automation. They‘re used to regulate actuators depend on the temperature and the measured moisture

Details on PAGE 106.

RAIN SENSOR

The measuring procedure via electrolytic AC voltage allows the Rain-Sensor RGM to detect various kinds of precipitation e.g. rain or snow. Thanks to the installed passive potentiometer the circuit sensitivity can be adjusted optimally to the required field of application.

Details on PAGE 107

DUCT SMOKE DETECTOR

Specially designed for use for smoke detection in ventilation ducts, the UG-5 AFR combines a conventional smoke detector with an Adapter system and finds particular application in the building.

Details on PAGE 124

OPTICAL SMOE DETECTOR

Thanks to the equipment with a new optical chamber and associated light source the highest precision is ensured in detecting even the smallest particles in the initial phase of a fire.

Details on PAGE 125

PRESSURE TRANSMITTER

The pressure transmitter DT1 with ceramic measuring cell is ideal for measuring relative pressure of non-aggressive media

Details on PAGE 139

PRESSURE AND DIFFERENTIAL PRESSURE TRANSDUCER

Our FDE40 is a pressure transmitters for overpressure, vacuum and differential pressure Measurements. The transmitter of this series is suitable for Measurements of broadly neutral liquids and gases.

Details on PAGE 140

AIR STREAM MONITOR

Air flow controller based on a microcontroller for measuring nonaggressive gaseous flows in the range of 0.5 to 10/30 m/s Available with both 0-10 V and 4-20 mA output

Details on PAGE 145

DO YOU NEED SOME FUTHER INFORMATION ABOUT OUR LATEST PRODUCT INNOVATIONS?

WEATHER STATION

Our weather stations can optionally be configured with different measurement ranges like wind, rain and sun.

Details on PAGE 158

WIND SENSOR

The wind transmitter is designed in order to detect the wind speed, the evaluation system is integrated in the wind sensor itself. Our wind transmitters are used in home automation and building automation.

Details on PAGE 159

COMBINED WIND SENSOR AND WIND DIRECTION SENSOR

The combined wind transmitter / wind direction sensor is used to detect the wind direction and the wind speed in one combination device, the evaluation system is integrated in the sensor.

Details on PAGE 161

Just give us a call:

+49 (0) 771 15 89 30 - 0

OUR HIGHLIGHT PRODUCT 2016/2017

DESIGN, EFFIZIENCY AND FUNCTION

THE LATEST UNIVERSAL HOUSING BY TiTEC®.

"DRIVEN BY INNOVATION" - Developed by our customers and users

The housing is made of high-quality and weather-resistant polyamide is specifically designed for outdoor use and premises with increased protection requirements. The assembly is simplified by suburb captive cover and bayonet fittings. The closure is just a ¼ turn, which is sufficient to open the housing or to close it. The replaceable cable gland brings more flexibility and therefore easy handling with it. The molded eyelets as optional backup of your installation using wired seals.

PLAIN, BUT STILL A KIND OF UNIQUE
EASY MOUNTABLE // STURDY // SAFE

YOU CAN FIND OUR OUR WHOLE ASSORTMENT EQUIPPED WITH THE NEW UNIVERSAL HOUSING IN THE FOLLWING CATEGORIES.

TEMPERATURE
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TEMPERATURE ACTIVE
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Humidity
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CO_2 + AIR QUALITY
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MOTION + LIGHT
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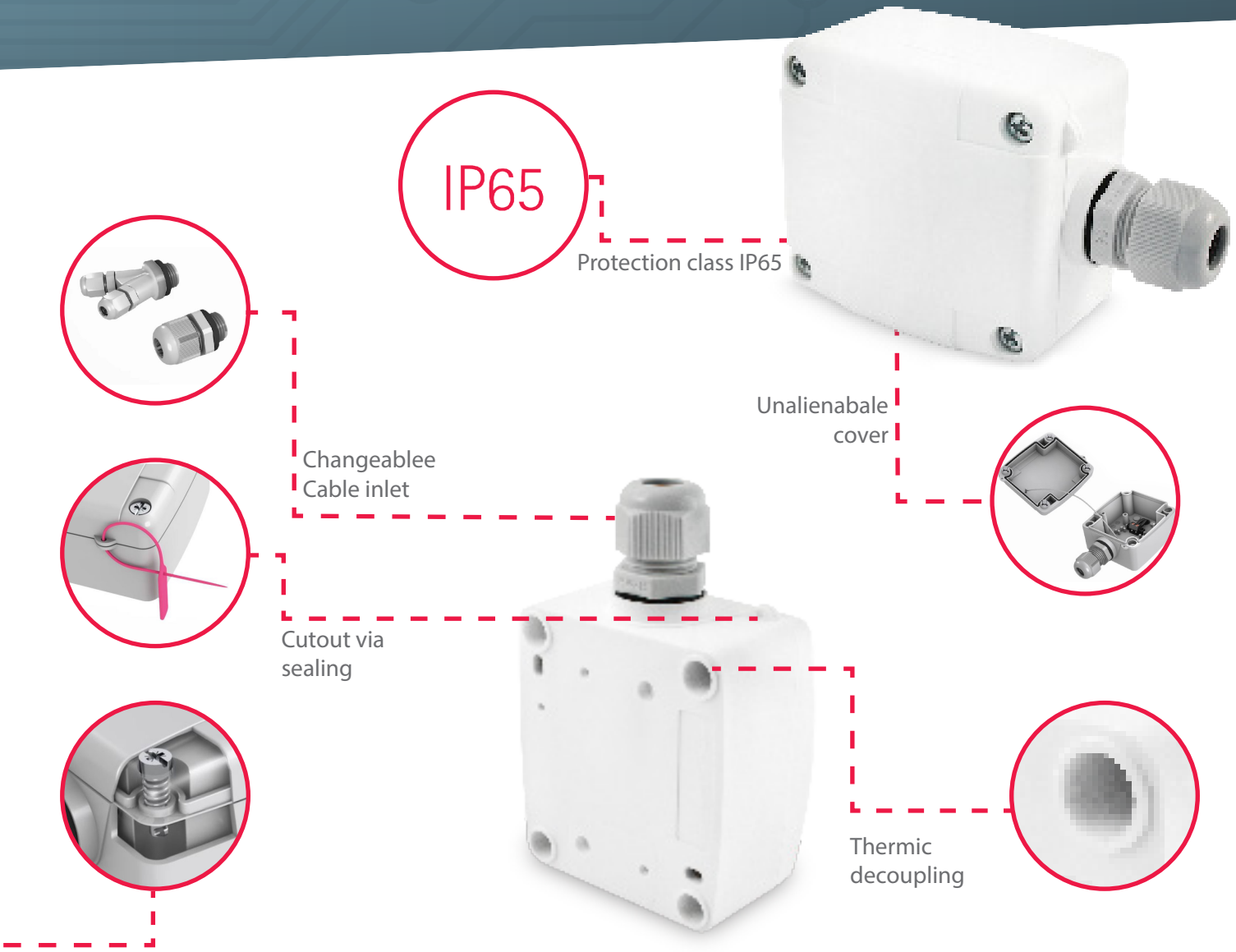


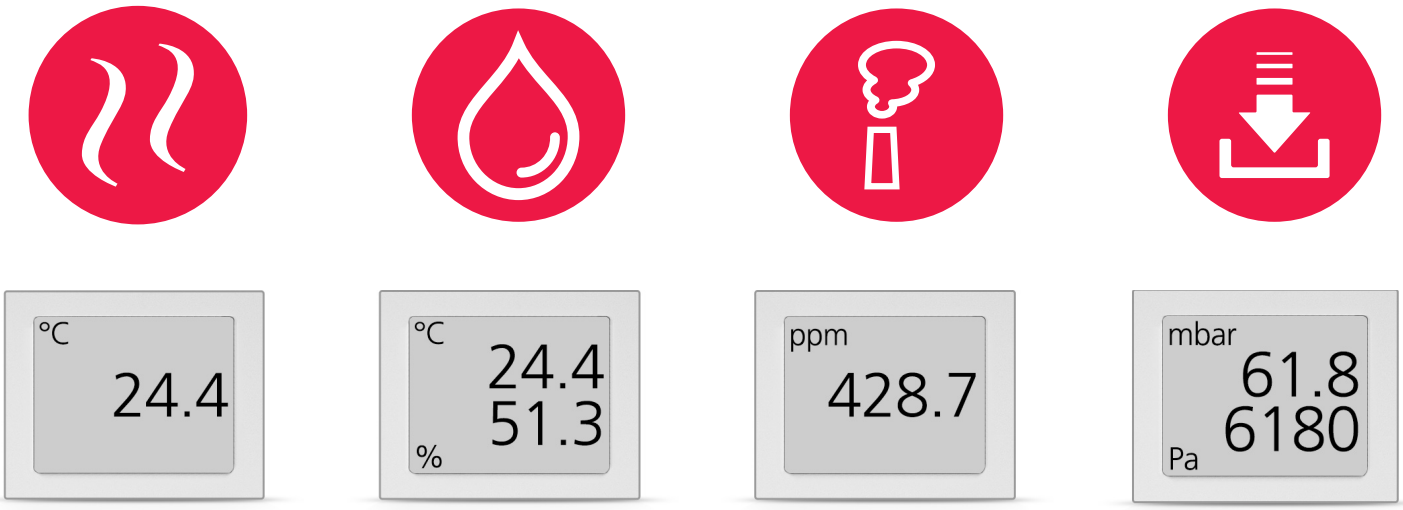
LATEST NEWS
OUR E-PAPER DISPLAY

LEARN MORE ABOUT THE ADVANTAGES

- E-Paper displays reflect light just as regular paper, therefore they are passive (non-luminating) displays
- Thin, light, flexible, good contrast, low energy consumption and no light reflections
- Easy reading even with high insolation and ambient brightness
- Customized labeled version available
- E-Paper displays only need energy when display contents change
- Optics and readability are significantly better than with monochrome LCDs or other bi-stable systems
- High readability indepedent of reader's angle of view

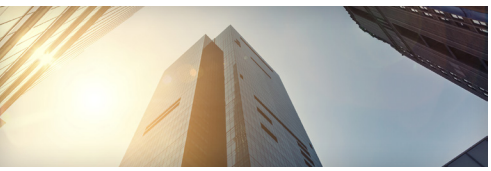
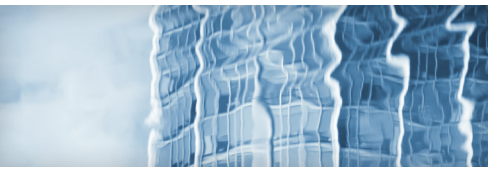
FLEXIBLE, EFFICIENT AND PRACTICAL.

THE NEW E-PAPER DISPLAY BY TITEC®.



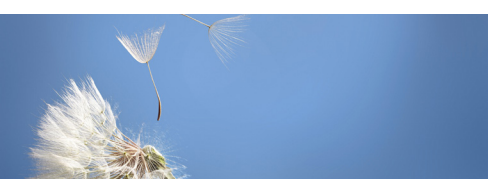
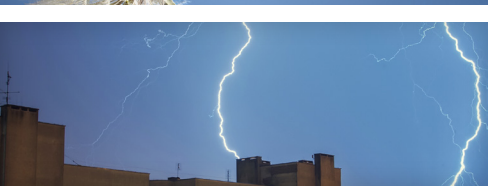
TiTEC®
SENSORIK NACH MAß

PRODUCT OVERVIEW





PRODUCT OVERVIEW

TEMPERATURE

TEMPERATURE SENSOR - THERMOCOUPLES - THERMOSTATS - MESURING TRANSDUCERS AND MORE

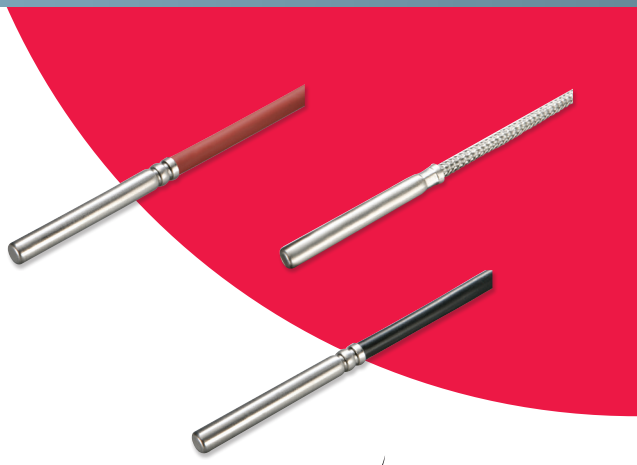
The physical size of the temperature relates to the thermodynamic balance: If two objects have the same temperature, no exchange of heat takes place between them - even if they are in direct contact with each other. This is different when the temperatures deviate.

In this case, a heat exchange takes place until both objects have the same temperature. The mean value between the two starting temperatures is called equilibrium temperature and is marked with the SI unit Kelvin (K). In Germany, Austra and Switzerland, the unit Celsius (°C) is also being used.

TiTEC offers a great range of products for the field of temperature measurements. Our advantage lies in the development and production of customer-specific solutions with individual options up printing your company logo onto the product.

Our sensors and/or sensing elements for active temperature Measurements feature an offset function that can be calibrated with the help of a potentiometer, 24 temperature ranges of your choice and a high measurements accuracy (±0.3 K).

CABLE/SURFACE TEMPERATURE SENSOR - KBTF



Application

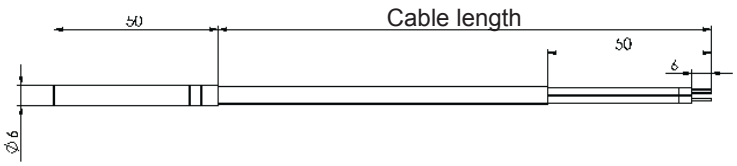
Apparatus for measuring the temperature in gaseous media. In combination with an immersion sleeve, the KBTF can also be used for measuring the temperature of liquid media (as in pipes, kettles or water tanks). With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems. The versions with PVC and Silicone connections feature a double roller-burnished sleeve as standard. The fibre glass/VA version is hexagon-shaped. Note: The KBTF with fibre glass connection can not be equipped with WPC.

WPC

3 Years Warranty

Technical Data	
Measuring range:	see table
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Core-end sleeves
Power supply cord:	2 m (see table)
Sleeve:	stainless steel
Measurements:	Ø6 x 50 mm
Protection class:	IP65 (Standard)

Technical Drawing KBTF



Overview (Product Group

Sensor Type						
PT100						
PT100 1/3DIN						
PT1000						
PT1000 1/3DIN						
Ni1000						
Ni1000TK5000						
NTC 5k, 10k, 20k, Precon, KTY81-210						
NTC 1,8 kOhm						
LM235Z						
DS18B20						
Accessories:						
Immersion sleeve Fitting length						
Immersion sleeve, brass						
Immersion sleeve , stainless steel						
Optional:						
Surcharge per meter						
3-wire connection						
4-wire connection						

Order example: Cable Temperature Sensor with Ni1000 sensor and 4 m high-temperature silicone cable = KBTF/Ni1000/4.0/T

Special models available on demand.

INDOOR PENDULUM TEMPERATURE SENSOR - RPF

Application

For indoor temperature measuring applications. The sensor is suspended from above, making it especially suitable for temperature Measurements in large rooms and halls with a high ceiling. With the help of the respective sensors (see table), the device can be connected to all conventional control and display systems.

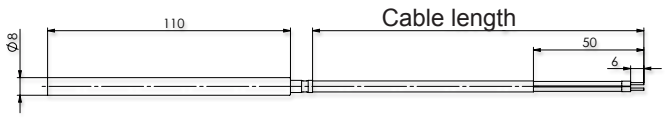
Further cable Types and lengths (including multiple wire connections and combination sensors) on demand.

WPC

3 Years Warranty

Technical Data	
Measuring range:	-50 °C … +105 °C
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Core-end sleeves
Power supply cord:	2 m PVC (Standard)
Sleeve:	stainless steel
Measurements:	Ø8 x 110 mm
Protection class:	IP54

Technical Drawing RPF



Overview (Product Group 1)

Sensor Type			
PT100			
PT100 1/3DIN			
PT1000			
PT1000 1/3DIN			
Ni1000			
Ni1000TK5000			
Fet			
NTC 5k, 10k, 20k, Precon, KTY81-210			
NTC 1,8 k			
LM235Z			
DS18B20			
Optional:			
3-wire-Connection / m			
4-wire-Connection / m			

Order example: Indoor Pendulum Temperature Sensor with 5m supply cord and Ni1000 sensor = RPF/Ni 1000/5.0

Special models available on demand.

IMMERSION TEMPERATURE SENSOR WITH FLEXIBLE SILICONE CONNECTION - KBTFL

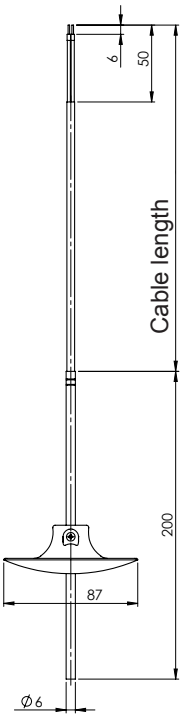
Application

Apparatus for measuring the temperature in gaseous media. In combination with an immersion sleeve, the KBTFL can also be used for measuring the temperature of liquid media (as in pipes, kettles or water tanks). The KBTFL is wellsuited for immersion applications thanks to the 200 mm sleeve. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range:	-50 °C … +200 °C - depends on sensor
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Core-end sleeves
Power supply cord:	2 m Silicone (Standard)
Sleeve:	stainless steel
Measurements:	Ø6 x 200 mm
Protection class:	IP65
Mounting equipment (incl.):	Mounting flange

Various other cable materials and lenghts, as well as multi-wire-connections and -sensors on demand.

Technical Drawing KBTFL



Overview (Product Group 1)

Sensor Type	
PT100	
PT100 1/3DIN	
PT1000	
PT1000 1/3DIN	
Ni1000	
Ni1000TK5000	
NTC 5k, 10k, 20k, Precon, KTY81-210	
NTC 1,8 k	
LM235Z	
DS18B20	
Optional:	
Surcharge per meter	
3-wire-Connection	
4-wire-Connection	

Order example: Cable Temperature Sensor with Ni1000 sensor and 4 m high-temperature silicone cable = KBTFL/PT100/4.0

Special models available on demand.

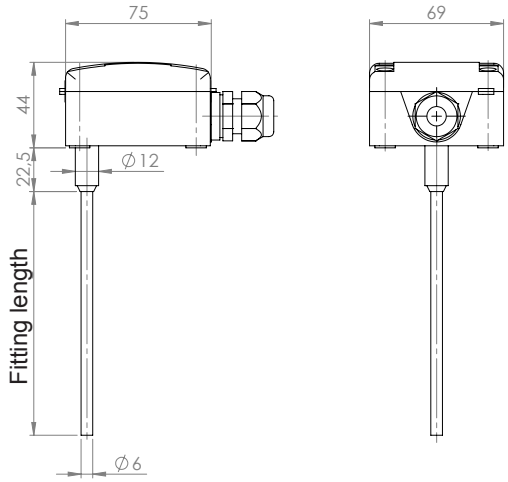
DUCT/IMMERSION TEMPERATURE SENSOR - KNTF

Application

Our Duct/Immersion temperature sensors are equipped with dew point resistance by default. In combination with an immersion sleeve, the KNTF can also be used for measuring the temperature of liquid/ nonaggressive media. Gasesous media may be measured with help of our mounting flange MF. The KNTF's fields of application are heating, ventilation and refrigeration engineering as well as air-conditioning. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range (head):	-50 °C … +180 °C - depends on sensor
Tmax. (housing):	+100 °C
Sensor:	on request(see table)
Protection sleeve:	Ø 6 mm , stainless steel
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Casing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (optional):	Immersion sleeve, Mounting flange, Screw clamps

Technical Drawing KNTF



Overview (Product Group 1)

Sensor Type	50 mm	100 mm	150 mm	200 mm	300 mm	400 mm
PT100						
PT100 1/3DIN						
PT1000						
PT1000 1/3DIN						
Ni1000Ni1000TK5000						
NTC 5k, 10k, 20k, Precon, KTY81-210						
NTC 1,8 k						
LM235Z						
DS18B20						
Optional:						
Mounting flange (Z-60.4)						
Immersion sleeve, brass						
Immersion sleeve, stainless steel						
3-wire-Connection						
4-wire-Connection						

Order example: Immersion Temperature Sensor with PT100-sensor and 150 mm brass immersion sleeve = KNTF/PT100/150/MS

Special models available on demand.

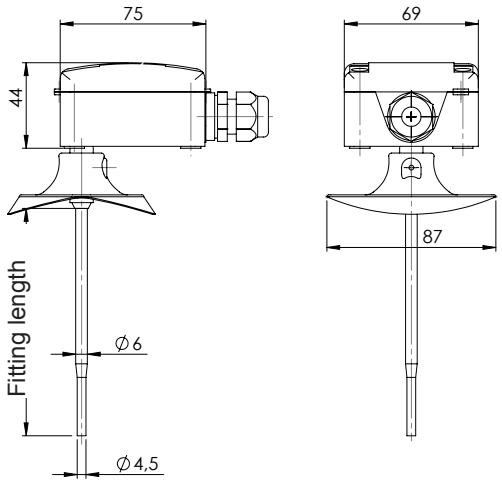
DUCT/IMMERSION TEMPERATURE SENSOR (FAST RESPONSE TIME) - KNTFS

Application

For fast duct temperature Measurements. Our Duct Temperature Sensors are equipped with dew point resistance by default. Gaseous media maybe measured with help of our monuting flange MF. The KNTFS's fields of application include heating, ventilation and refrigeration engineering as well as air-conditioning. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range (head):	-50 °C … +180 °C - depends on sensor
Tmax. (housing):	+100 °C
Sensor:	on request (see table)
Protection sleeve:	Ø 6 mm tapered to Ø 4,5 mm, stainless steel
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm^2
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Response time t_{90}:	20 Seconds
Protection class:	IP65
Mounting equipment (optional):	Mounting flange, Screw clamps

Technical Drawing KNTFS

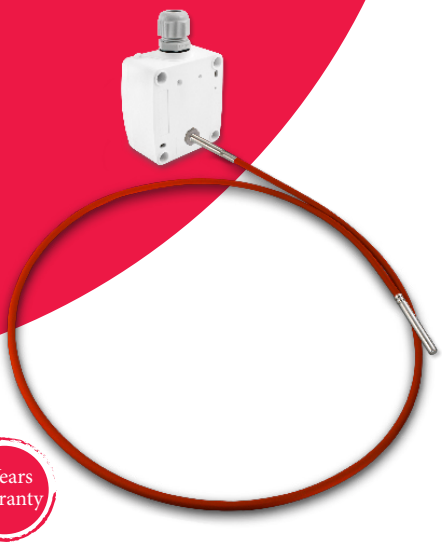


Overview (Product Group 1)

Sensor Type	50 mm	100 mm	150 mm	200 mm	300 mm	400 mm
PT100						
PT100 1 / 3DIN						
PT1000						
PT1000 1 / 3DIN						
Ni1000						
Ni1000TK5000						
NTC 5k, 10k, 20k, Precon						
NTC 1,8 kOhm						
Optional and Accessories:						
Mounting flange (Z-60.4)						
3-wire-Connection						
4-wire-Connection						

Order example: Immersion Temperature Sensor with Ni1000 sensor, 100mm, with mounting flange = KNTFS/Ni1000/100/MF

Special models available on demand.



IMMERSION TEMPERATURE SENSOR WITH FLEXIBLE SILICONE CONNECTION - KNTFF

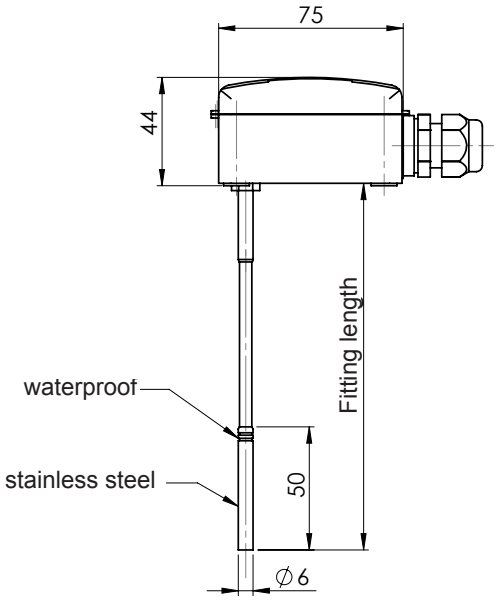
Application

Thanks to its design, the KNTFF Immersion Temperature Sensor is suited for a variety on applications in gaseous or liquid media. The flexible silicone connections helps to easily place the measuring point even in confined spaces. The sensor is mounted with the help of screw clamps, a mounting flange or an immersion sleeve.

Various other cable materials and lenghts, as well as multi-wire-connections and -sensors on demand.

Technical Data	
Measuring range (head):	-50 °C … +200 °C - depends on sensor
Tmax. (housing):	+100 °C
Sensor:	on request(see table)
Protection sleeve Sensor:	6 x 50 mm stainless steel
Neck tube:	6 x 50 mm stainless steel
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Power supply cord:	300 mm Silicone (Standard)
Fitting length:	max. 300 mm
Protection class:	IP65
Mounting equipment (optional):	Immersion sleeve, Mounting flange, Screw clamps

Technical Drawing KNTFF



Overview (Product Group 1) Fitting length

Sensor Type	300 mm
PT100	
PT100 1/3DIN	
PT1000	
PT1000 1/3DIN	
Ni1000	
Ni1000TK5000	
NTC 5k, 10k, 20k, Precon, KTY81-210	
NTC 1,8 kOhm	
LM235Z	
DS18B20	
Optional:	
3-wire-Connection	
4-wire-Connection	

Order example: Immersion Temperature Sensor with LM235Z sensor = KNTFF/LM235Z

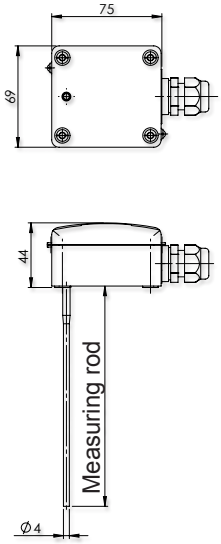
Special models available on demand.

MEAN VALUE TEMPERATURE SENSOR - MWTF

Application
For measuring the temperature in gaseous media (when combined with a mounting flange). Areas of application: ventilation systems with large duct diameters. The sensor rod is mounted in a trapezoid shape and with the help of mounting brackets. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range:	-30 °C … +80 °C
Sensor:	on request(see table)
Measuring rod :	Copper 4 x 0,5 mm (flexible), length (see table)
Neck tube:	60 mm stainless steel Ø 6 mm
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (optional):	Mounting clamp, Mounting flange, Screw clamps

Technical Drawing MWTF



Overview (Product Group 1) Fitting length (blank) "B" (shrunk) "S"

Sensor Type	3 m	6 m	10 m	3 m	6 m	10 m
PT100						
PT1000						
Ni1000						
Ni1000TK5000						

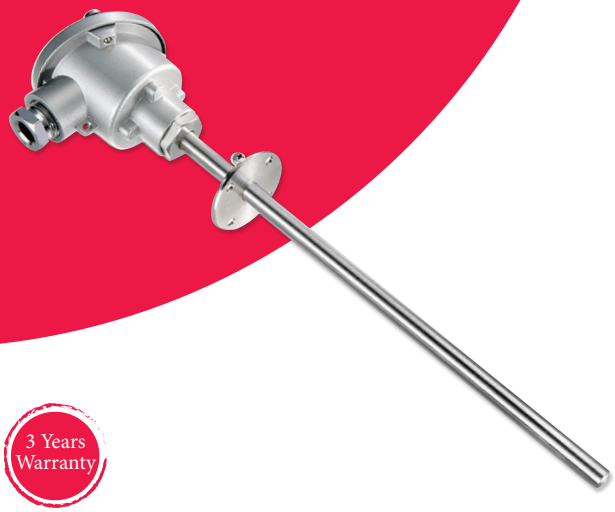
Accessories

Mounting clamp MK (6 pieces)	
Mounting flange MF (Z-60.4)	
Optional:	
3-wire-Connection	
4-wire-Connection	


Mounting clamp


Flange

Order example: Mean Value Temperature Sensor with Ni1000 sensor and 3 m sensor capillary (blank) = MWTF/Ni1000/3/B
Special models available on demand.



3 Years Warranty

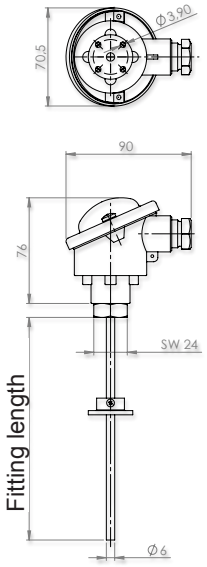
HIGH TEMPERATURE SENSOR - HTFB1

Application

The HTFB1 is a high temperature sensor with a measuring range of -50°C ... +600°C. The device is equipped with an internal measuring unit and can easily be mounted on the container or duct to be measured (with the mounting flange included in the delivery). With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range (sensor):	-50 °C … +600 °C
Tmax. head:	100 °C
Sensor:	on request(see table)
Protection sleeve:	Ø 6 mm, stainless steel
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	Aluminum, B shape
Cable inlet:	M20 x 1,5
Measuring unit:	Integrated, vibration-proof
Protection class:	IP54
Mounting equipment (incl.):	Mounting flange
Mounting equipment (optional):	Immersion sleeve, Screw clamps

Technical Drawing HTFB1



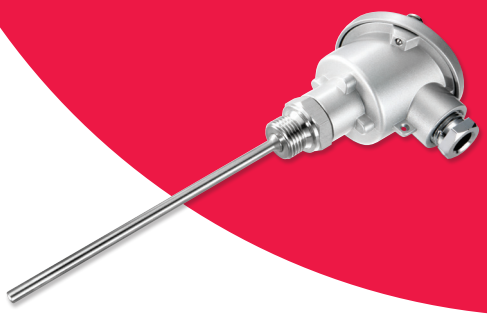
Overview (Product Group 1) Fitting length

Sensor Type	100 mm	200 mm	300 mm	400 mm
PT100				
PT1000				
Optional:				
3-wire-Connection				
4-wire-Connection				

Order example: High Temperature Sensor with Pt1000 sensor = HTFB1/PT1000

Special models available on demand.

SCREW-IN SENSOR - HTFB2



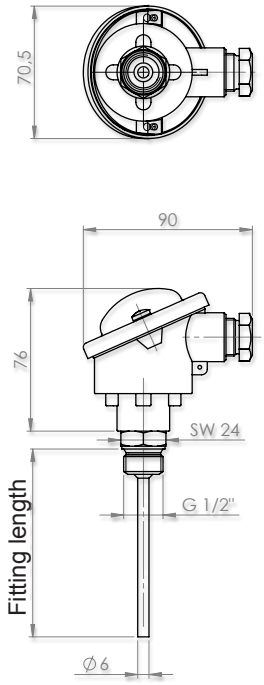
Application

Our HTBF2 is a screw-in sensor with a B shape connecting head. It is used for measuring the temperature in liquid or gaseous media in heating, ventilation and air-conditioning applications. The screw-in sensor has a measuring range of -50°C ...+180°C with a maximum pressure of 40 bar. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

3 Years Warranty

Technical Data	
Measuring range (sensor):	-50 °C . . . +400 °C (at NTC`s max. +150 °C)
Tmax. head:	100 °C
Sensor:	on request(see table)
Protection sleeve:	Ø 6 mm, stainless steel
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	Aluminum, B shape
Cable inlet:	M20 x 1,5 mm
Pressure resistance:	40 bar
Connection Thread:	G1/2" SW24
Measuring unit:	Integrated
Protection class:	IP54
Mounting equipment (optional):	Immersion sleeve THVA3

Technical Drawing HTFB2

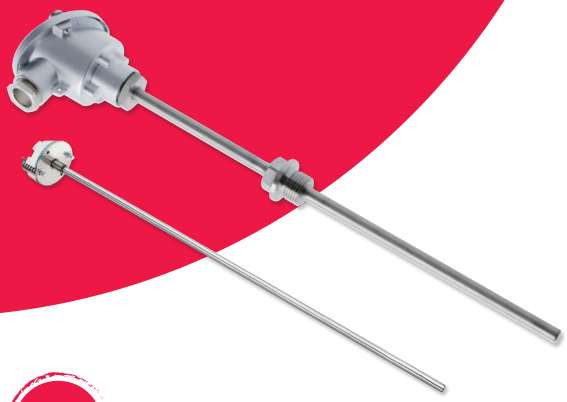


Overview (Product Group 1) Fitting length

Sensor Type	100 mm	200 mm	300 mm	400 mm
PT100				
PT100 1/3DIN				
PT1000				
PT1000 1/3DIN				
Ni1000				
Ni1000TK5000				
Fet				
NTC 5k, 10k, 20k, Precon				
NTC 1,8 kOhm				
Optional:				
3-wire-Connection				
4-wire-Connection				

Order example: High Temperature Sensor with Ni1000 sensor = HTFB2/Ni1000

Special models available on demand.



3 Years Warranty

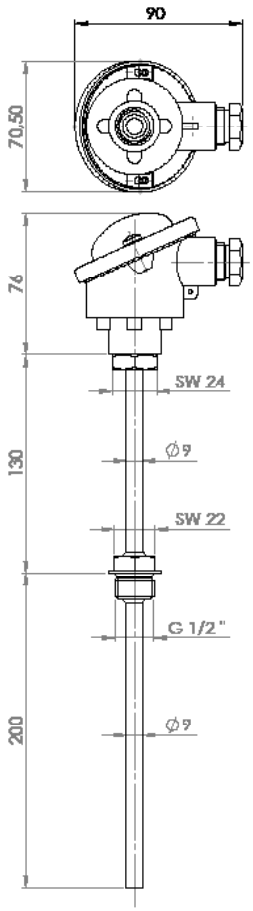
SCREW-IN SENSOR (WITH NECK TUBE) - HTFB3

Application

Our HTFB3 features an interchangable measuring unit and has an application temperature of -50°C ... +600°C. The sensor is used to record an accurate measurement of the perceived temperature. With the help of the respective sensors (see below), the device can be connected to all conventional control and display systems. The sensor is directly connected to the pipe to be measured with the help of a stainless steel sleeve and a G1/2" thread.

Technical Data	
Measuring range (sensor):	-50 °C ... +600 °C
Tmax. head:	100 °C
Sensor:	on request(see table)
Protection sleeve:	Ø 6 mm, stainless steel
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	Aluminum, B shape
Cable inlet:	M20 x 1,5
Pressure resistance:	40 bar
Connection Thread:	G1/2" SW22
Height connection thread+ hex:	30mm
Measuring unit:	Ø 6 mm, changeable
Protection class:	IP54

Technical Drawing HTFB3



Overview (Product Group 1) Fitting length

Sensor Type	100 mm	250 mm	400 mm
PT100			
PT1000			
Optional:			
3-wire-Connection			
4-wire-Connection			

Order example: High Temperature Sensor with Pt100 sensor = HTFB3/PT100

Special models available on demand.

INSERTION TEMPERATURE SENSOR - HTFJ1

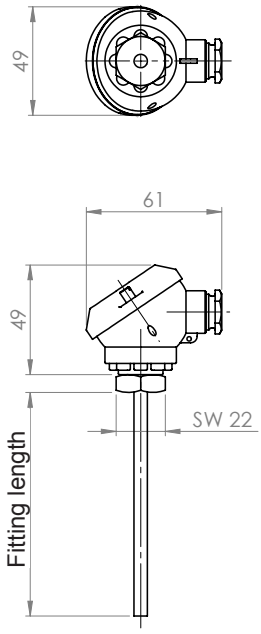
3 Years Warranty

Application

The HTFJ1 is a high temperature sensor with a measuring range of -50°C ... +400°C. The device is equipped with an internal measuring unit and can easily be mounted on the container or duct to be measured (with the mounting flange included in the delivery). With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range (sensor):	-50 °C … +400 °C
Tmax. head:	100 °C
Sensor:	on request(see table)
Protection sleeve:	Ø 6 mm, stainless steel
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	Aluminium, Form J
Cable inlet:	M16
Measuring unit:	Integrated, vibration-proof
Protection class:	IP54
Mounting equipment (optional):	Mounting flange, Immersion sleeve und Screw clamps

Technical Drawing HTFJ1



Overview (Product Group 1) Fitting length

Sensor Type	100 mm	200 mm	300 mm	400 mm
PT100				
PT100 1/3DIN				
PT1000				
PT1000 1/3DIN				
Ni1000				
Ni1000TK5000				
Fet				
NTC 5k, 10k, 20k, Precon				
NTC 1,8 kOhm				
Optional:				
3-wire-Connection				
4-wire-Connection				
Mounting flange MF (Z-60)				
Immersion sleeve Stainless steel				

Bestellbeispiel: Insertion temperature sensor mit Ni1000-Sensor und 200 mm Fitting length = HTFJ1 / Ni1000 / 200

Special models available on demand.

3 Years Warranty

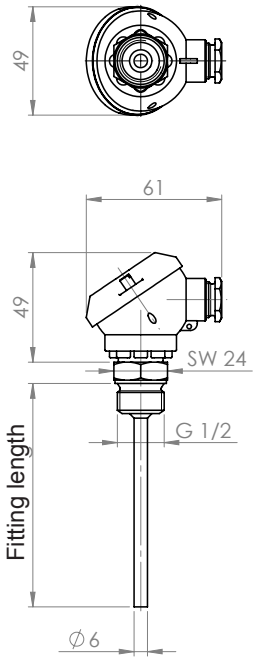
SCREW-IN SENSOR - HTFJ2

Application

Our HTBJ2 is a screw-in sensor with a J shape connecting head. It is used for measuring the temperature in liquid or gaseous media in heating, ventilation and air-conditioning applications. The screw-in sensor has a measuring range of -50°C ...+180°C with a maximum pressure of 40 bar. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range (sensor):	-50 °C … +400 °C (at NTC`s max. +150 °C)
Tmax. head:	100 °C
Sensor:	on request(see table)
Protection sleeve:	Ø 6 mm, stainless steel
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	Aluminium, Form J
Cable inlet:	M16
Pressure resistance:	40 bar
Connection Thread:	G1/2" SW24
Measuring unit:	Integrated
Protection class:	IP54
Mounting equipment (optional):	Immersion sleeve THVA3

Technical Drawing HTFJ2



Overview (Product Group 1) Fitting length

Sensor Type	100 mm	200 mm	300 mm	400 mm
PT100				
PT100 1/3DIN				
PT1000				
PT1000 1/3DIN				
Ni1000				
Ni1000TK5000				
Fet				
NTC 5k, 10k, 20k, Precon				
NTC 1,8 kOhm				
Optional:				
3-wire-Connection				
4-wire-Connection				

Bestellbeispiel: Screw-In sensor mit PT100-Sensor und 100 mm Fitting length = HTFJ2 / PT100 / 100

Special models available on demand.

CONTACT TEMPERATURE SENSOR - ANTF1 / ANTF2

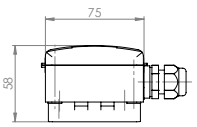
Application

For measuring the temperature on round surfaces like pipes. There are two sensor types available. Both are equipped with an aluminum prism and delivered with a tension band, allowing an easy and fast mounting on round surfaces such as cold and hot water pipes. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

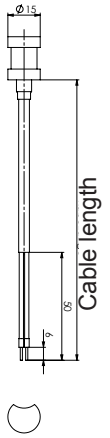
Various other cable materials and lenghts, as well as multi-wire-connections and -sensors on demand.

Technical Data	ANTF1	ANTF2
Measuring range:	-50 °C … +100 °C (Standard)	-50 °C … +105 °C
Sensor:	on request(see table)	on request(see table)
Switching mode:	2-wire connection (Standard)	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²	Core-end sleeves
Power supply cord:	—	2 m PVC (Standard)
Housing:	PA6 15% GK, Colour RAL 9010	Aluminum sleeve
Measurements:	75 x 69 x 44 mm	29 x 15 mm
Protection class:	IP65	IP54
Mounting equipment (incl.):	Tension band	Tension band

Technical Drawing ANTF1



Technical Drawing ANTF2



Overview (Product Group 1)

Sensor Type	ANTF1	ANTF2
PT100		
PT100 1/3DIN		
PT1000		
PT1000 1/3DIN		
Ni1000		
Ni1000TK5000		
NTC 5k, 10k, 20k, Precon, KTY81-210		
NTC 1,8 kOhm		
LM235ZDS18B20		
Optional:		
3-wire-Connection		
4-wire-Connection		

Order example: Contact Temperature Sensor with housing and Ni1000 sensor = ANTF1/Ni1000

Special models available on demand.

CONTACT TEMPERATURE SENSOR - ANTF3VA / ANTF3MS

Application

For measuring the temperature on round surfaces such as pipes. The sensors are available as stainless steel or brass version. The rounded egde at the end of the sensor and the included tension band allow an easy mounting on pipes. With help of the respective sensors (see below) , the device can be connected to all conventional control and display systems. A tension band is included in the delivery.

WPC

3 Years Warranty

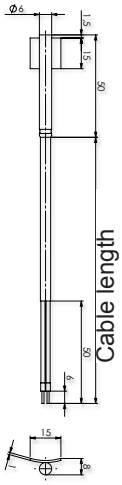
Technical Data	ANTF3VA	ANTF3MS
Measuring range:	-50 °C … +105 °C	-50 °C … +105 °C
Sensor:	on request(see table)	on request(see table)
Switching mode:	2-wire connection (Standard)	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²	Core-end sleeves
Power supply cord:	2 m PVC (Standard)	2 m PVC (Standard)
Sleeve:	Stainless steel	Brass
Measurements:	see Technical Drawing	see Technical Drawing
Protection class:	IP54	IP54
Mounting equipment (incl.):	Tension band	Tension band

Various other cable materials and lenghts, as well as multi-wire-connections and -sensors on demand.

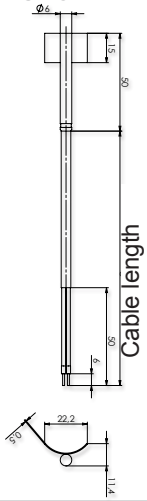
Overview (Product Group 1)

Sensor Type	ANTF3VA	ANTF3MS
PT100		
PT100 1/3DIN		
PT1000		
PT1000 1/3DIN		
Ni1000		
Ni1000TK5000		
NTC 5k, 10k, 20k, Precon, KTY81-210		
NTC 1,8 kOhm		
LM235Z		
DS18B20		
Optional:		
3-wire-Connection		
4-wire-Connection		

Technical Drawing ANTF3VA



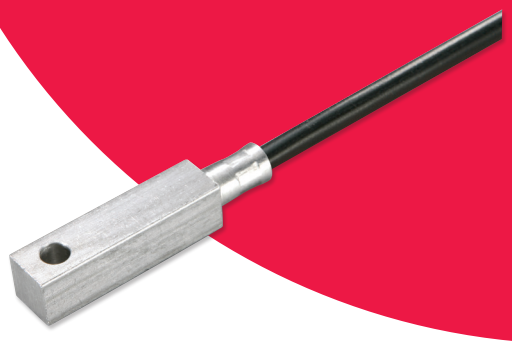
Technical Drawing ANTF3MS



Order example: Contact Temperature Sensor ANTF3MS with Ni1000 sensor = ANTF3MS/Ni1000

Special models available on demand.

SURFACE TEMPERATURE SENSOR - OBTF

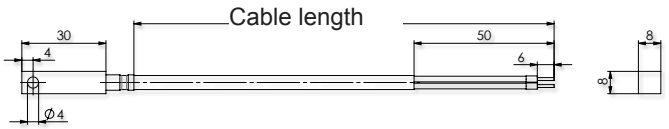


Application
The Surface Temperature Sensor OBTF is designed for measuring the temperature on plain surfaces such as windows. The contact surface is made of aluminum and can be mounted to the respective surface with the drill hole (4,1 mm) located on the upper half of the sensor. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Various other cable materials and lenghts, as well as multi-wire-con-

Technical Data	
Measuring range:	-50 °C … +105 °C
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Core-end sleeves
Power supply cord:	2 m PVC (Standard)
Measurements:	8 x 8 x 40 mm Aluminium
Protection class:	IP54

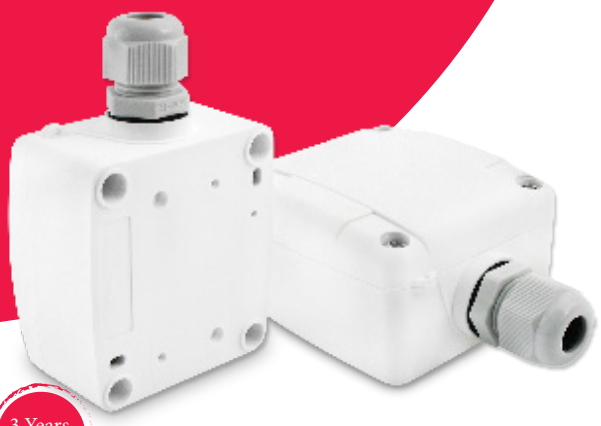
Technical Drawing OBTF



Overview (Product Group 1)

Sensor Type	OBTF
PT100	
PT100 1/3DIN	
PT1000	
PT1000 1/3DIN	
Ni1000	
Ni1000TK5000	
NTC 5k, 10k, 20k, PreconNTC 1,8 kOhm	
Optional	
3-wire-Connection	
4-wire-Connection	

Order example: Surface Temperature Sensor with Ni1000 sensor and 4 m high-temperature silicone cable = OBTF/Ni1000/4.0/T
Special models available on demand.



3 Years Warranty

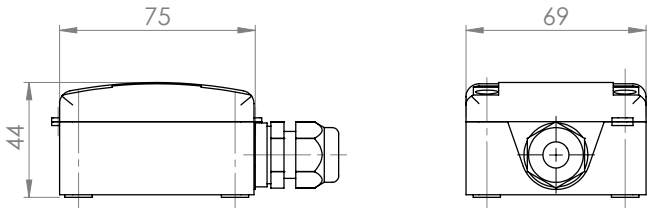
OUTDOOR TEMPERATURE SENSOR - AUTF

Application

Our AUTF is available with all commom sensor Types. Measurement takes places inside the sturdy and humidity-resistant plastic housing. The AUTF is mainly used in weather-dependend environments, such as outer walls (please avoid direct insolation). With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range:	-50 °C … +100 °C
Tmax. (housing)	+100°C
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (incl.):	Screws and dowels

Technical Drawing AUTF



Overview (Product Group 1)

Sensor Type	AUTF
PT100	
PT100 1/3DIN	
PT1000	
PT1000 1/3DIN	
Ni1000	
Ni1000TK5000	
NTC 5k, 10k, 20k, Precon, KTY81-210	
NTC 1,8 kOhm	
LM235Z	
DS18B20	
Optional:	
3-wire-Connection	
4-wire-Connection	

Order example: Outdoor Temperature Sensor with Ni1000 sensor = AUTF/Ni1000

Special models available on demand.

OUTDOOR TEMPERATURE SENSOR - AUTFext / AUTFextS

Application

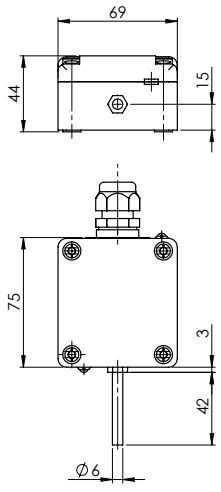
Our AUTFEXT/AUFTEXTS are available with all common sensor types. The temperature is measured inside the sensor tube. The AUFTFEXTS is equipped with a tapered sleeve for an ever faster response time. The sensors are mainly used in weather-dependend environments, such as outer walls (avoid direct insolation). With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	AUTFext	AUTFextS
Measuring range:	-50 °C … +100 °C	-50 °C … +100 °C
Tmax. (housing)	+100°C	+100°C
Sensor:	(see table)	(see table)
Switching mode:	2-wire connection (Standard)	2-wire connection (Standard)
Connection :	max. 1,5 mm^2	max. 1,5 mm^2
Housing:	PA6 15% GK, Colour RAL 9010	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm	75 x 69 x 44 mm
Sleeve length:	6 x 42 mm	5 x 47 mm (tapered to 3,5 x 25 mm)
Protection class:	IP65	IP65
Response time t_{90}:	20 Seconds	16 Seconds
Mounting equipment (incl.):	Screws and dowels	Screws and dowels

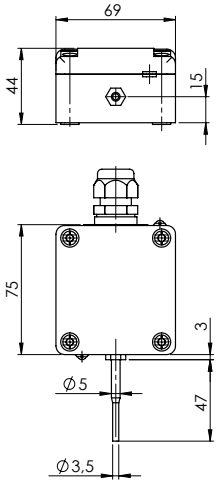
Overview (Product Group 1)

Sensor Type	AUTFext	AUTFextS
PT100		
PT100 1/3DIN		
PT1000		
PT1000 1/3DIN		
Ni1000		
Ni1000TK5000		
NTC 5k, 10k, 20k, Precon, KTY81-210		
KTY81-210		
NTC 1,8 kOhm		
LM235Z		
DS18B20		
Optional:		
3-wire-Connection		
4-wire-Connection		

Technical Drawing AUTFext



Technical Drawing AUTFextS



Order example: Outdoor Temperature Sensor with NTC 1.8 kOhm sensor = AUTFext/NTC1,8kohm

Special models available on demand.

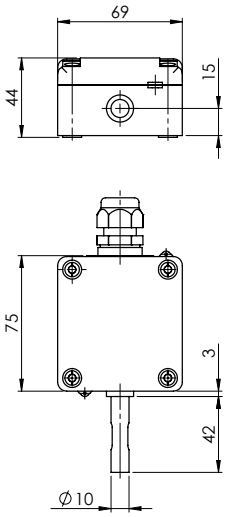
OUTDOOR TEMPERATURE SENSOR WITH SUN PROTECTION - AUTFext2

Application

The AUTFEXT2 is used for temperature measurements in outdoor areas. Radiant heat is diverted via the integrated feeler tube, protecting the device from insolation and thus allowing a more accurate measurement. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	AUTFext2
Measuring range:	-50 °C … +100 °C
Tmax. (housing):	100°C
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Sun protection (Sleeve):	10 x 42 mm
Protection class:	IP65
Mounting equipment (incl.):	Screws and dowels

Technical Drawing AUTFext2



Overview (Product Group 1)

Sensor Type	AUTFext2
PT100	
PT100 1/3DIN	
PT1000	
PT1000 1/3DIN	
Ni1000	
Ni1000TK5000	
NTC 5k, 10k, 20k, Precon, KTY81-210	
NTC 1,8 kOhm	
LM235Z	
DS18B20	
Optional:	
3-wire-Connection	
4-wire-Connection	

Order example: Outdoor Temperature Sensor with Pt1000 sensor = AUTFext2/PT1000

Special models available on demand.

INDOOR TEMPERATURE SENSOR (SURFACE-MOUNTED) - RTF3 / RTFVA

3 Years Warranty

Application

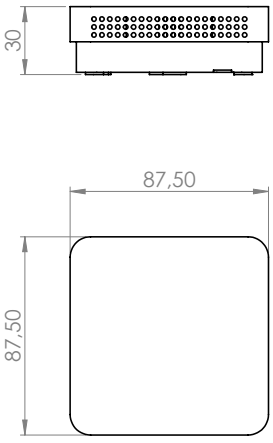
For measuring the temperature in living and office spaces, reception halls, foyers etc. The modern and plain design allows for easy and inconspicuous mounting. With the help of the respective sensors (see below), the device can be connected to all conventional control and display systems.

Technical Data	RTF3	RTFVA
Measuring range:	-35 °C … +70 °C	-35 °C … +70 °C
Sensor:	on request(see table)	on request(see table)
Switching mode:	2-wire connection (Standard)	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm^2	Screw clamps, max 1.5 mm^2
Housing:	ABS in RAL 9010	Stainless steel 1.4571
Measurements Housing:	87,5 x 87,5 x 30 mm	75 x 75 x 25 mm
Protection class:	IP30	IP30

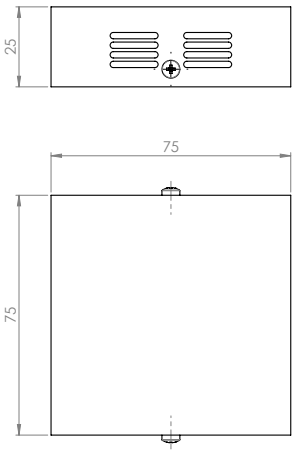
Overview (Product Group 1)

Sensor Type	RTF3	RTFVA
PT100		
PT100 1/3DIN		
PT1000		
PT1000 1/3DIN		
Ni1000		
Ni1000TK5000		
Fet		
NTC 5k, 10k, 20k, Precon, KTY81-210		
NTC 1,8 kOhm		
LM235Z		
DS18B20		
Optional:		
3-wire-Connection		
4-wire-Connection		

Technical Drawing RTF3



Technical Drawing RTFVA



Order example: Indoor Temperature Sensor 3 with Ni1000 sensor = RTF3/Ni1000

Special models available on demand.

INDOOR TEMPERATURE SENSOR WITH CONTROL ELEMENTS (SURFACE-MOUNTED) - RTF3XXX

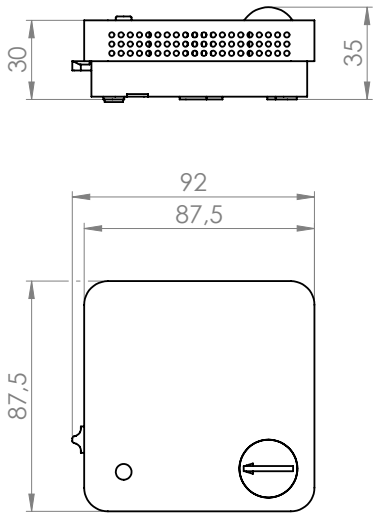
3 Years Warranty

Application

Our Indoor Temperature Sensors with optional control elements are designed for measuring the temperature in living and office spaces, reception halls, foyers etc. With the help of the respective sensors (see table), the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range:	-35 °C … +70 °C
Temperature sensor:	on request(see table)
Power supply:	24 VAC / VDC
Potentiometer:	0-10 V, 1 kOhm, 5 kOhm, 10 kOhm
Pushbutton:	10 mA, 35 VDC
LED:	24 VDC (green, yellow and red)
Switch:	5-step-slide-switch
Housing:	ABS in RAL 9010
Measurements:	87,5 x 87,5 x 30 mm
Connection:	Screw clamps max. 1.5 mm²
Switching mode Sensor:	2-wire connection (Standard)
Protection class:	IP30

Indoor temperature sensor
RTF3xxx



Overview (Product Group 1)

Type	Item		
RTF3	RTF3 basic passive (incl. sensor)		
RTF3.1	RTF3 basic active (incl. Sensor)		

Configuration

Type	Item	
P1k	Potentiometer (passive) 1 kOhm	
P5k	Potentiometer (passive) 5 kOhm	
P10k	Potentiometer (passive) 10 kOhm	
PA	Potentiometer (active) 0 … 10 V	
T	Pushbutton	
T / L	Pushbutton+LED	
Lgr	LED green	
Lge	LED yellow	
Lrt	LED red	
S	5-step slide switch	

Order exampe: Indoor temperature sensor with Ni1000-sensor, Pushbutton, 5 kOhm-Poti and LED yellow
= RTF3 / Ni1000 / P5k / T / Lge

Special models available on demand.

INDOOR TEMPERATURE SENSOR WITH/WITHOUT CONTROL ELEMENTS (FLUSH-MOUNTED)

Application

For measuring the temperature in living and office spaces, reception halls, foyers etc. The modern and plain design allows for easy and inconspicuous mounting. With the help of the respective sensors (see below), the device can be connected to all conventional control and display systems.

Technical Data	
Power supply:	24 VAC / VDC (active device)
Measuring range (temp):	0 °C … +50 °C
Switching mode :	2-wire connection (Standard)
Potentiometer:	1 kOhm (Standard)
Pushbutton:	Make contacts, 24 VAC, 8 mA
Rotary switch:	24 VAC + 20%; -15%, 50 / 60 Hz
LED:	Green / Red, 8 mA 24 VDC
Electrical Connection:	plug-in/screw terminals (dependent on switch range)
Protection rating:	III
Protection class:	IP20
Temperature sensors:	Pt100, Pt1000, Ni1000, Ni1000TK5000 (L+G), NTC1,8 k, NTC10 k, NTC20 k, LM235Z or active output 0-10 V
Switch ranges:	Berker Module2 (BM2) - Berker S1 (BS1) - Busch Jaeger Reflex SI alpine white (BJR) - Busch Jaeger Duro 2000I white (BJD) Busch Jaeger Future manhattan/graphite (BJF) -GIRA S55, pure white (GS55) - GIRA E2, silk matt (GE2) - Jung LS990 - (JLS990) - Merten M-Plan (MMP) - Merten M-SMART (MMS)

Overview (Product Group 2)

Switch range	Sensor	Model	Order code	
(see above)	(see above)	sensor only	1	
(see above)	(see above)	Sensor, potentiometer 1 kOhm	2	
(see above)	(see above)	Sensor, Pushbutton and LED (green)	3	
(see above)	(see above)	Sensor, Potentiometer 1 kOhm, Rotary switch 0, 1, 2, 3	4	
(see above)	(see above)	Sensor, Potentiometer 1 kOhm, 2 Pushbuttons , 2 LED (gr/rd)	5	
(see above)	(see above)	Sensor, Potentiometer 1 kOhm, 1 Pushbutton ,1 LED (gr)	6	
(see above)	(see above)	Sensor, Potentiometer 1 kOhm, 1 Pushbutton 2 LED (gr/rd)	7	

Order example: Berker Modul 2 (BM2)/ Ni1000 sensor/potentiometer 1 kOhm, 2 pushbuttons and 2 LEDs (5) = BM2-Ni1000-5

Special models available on demand.

RADIATION SENSOR - STF

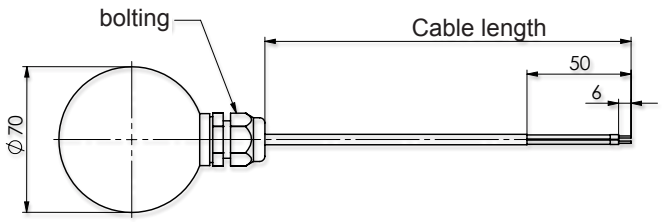
3 Years Warranty

Application
For indoor temperature measuring applications. The sensor is suspended from above, making it especially suitable for temperature Measurements in large rooms and halls with a high ceiling. The Radiation sensor is used to record an accurate measurement of the perceived temperature. With the help of the respective sensors (see table), the device can be connected to all conventional control and display systems.

Various other cable materials and lenghts,
as well as multi-wire-connections and -sensors on demand.

Technical Data	
Measuring range:	-30 °C … +70 °C
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Core-end sleeves
Power supply cord:	PVC black, 2 x 0,25 mm²
Sphere:	Diameter: 70 mm
Protection class:	IP30

Technical Drawing STF



Overview (Product Group 1)

Sensor Type	1,5 m	3 m	5 m	10 m
PT100				
PT100 1/3DIN				
PT1000				
PT1000 1/3DIN				
Ni1000				
Ni1000TK5000				
NTC 5k, 10k, 20k, Precon, KTY81-210				
NTC 1,8 kOhm				
LM235Z				
DS18B20				
Optional				
3-wire-Connection / m				
4-wire-Connection / m				

Order example: Radiation sensor with 5 m supply cord and Ni1000 sensor = STF/Ni1000/5.0
Special models available on demand.

RADIATION SENSOR - INDOOR - RSTF

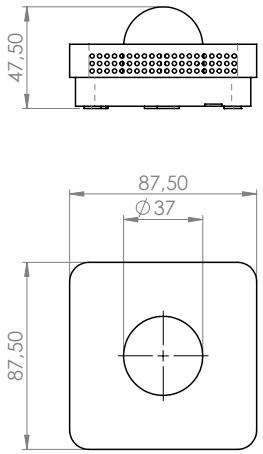
Application

For indoor temperature measuring applications. The Radiation sensor is used to record an accurate measurement of the perceived temperature. With the help of the respective sensors (see table), the device can be connected to all conventional control and display systems.

3 Years Warranty

Technical Data	RTF3
Measuring range:	-35 °C … +70 °C
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	ABS in RAL 9010
Measurements Housing:	87,5 x 87,5 x 47,5 mm
Protection class:	IP30
Sphere:	Diameter: 37 mm

Technical Drawing RSTF



Overview (Product Group 1)

Sensor Type	RSTF
PT100	
PT100 1/3DIN	
PT1000	
PT1000 1/3DIN	
Ni1000	
Ni1000TK5000	
NTC 5k, 10k, 20k, Precon, KTY81-210	
NTC 1,8 kOhm	
LM235Z	
DS18B20	
Optional:	
3-wire-Connection	
4-wire-Connection	

Order example: Radiation sensor with Pt1000 sensor = RSTF/PT1000

Special models available on demand.

RADIATION SENSOR - OUTDOOR - ASTF

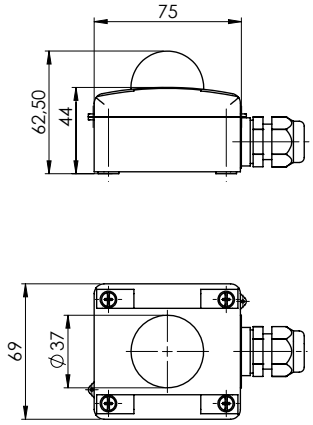
3 Years Warranty

Application

For outdoor temperature measuring applications. The Radiation sensor is used to record an accurate measurement of the perceived temperature. With the help of the respective sensors (see table), the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range:	-50 °C … +100 °C
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps, max 1.5 mm²
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (incl.):	Screws and dowels
Sphere:	Diameter: 37 mm

Technical Drawing ASTF



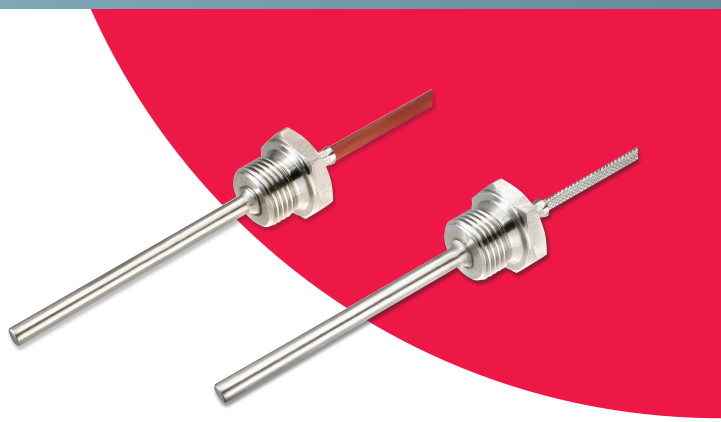
Overview (Product Group 1)

Sensor Type	ASTF
PT100	
PT100 1/3DIN	
PT1000	
PT1000 1/3DIN	
Ni1000	
Ni1000TK5000	
NTC 5k, 10k, 20k, Precon, KTY81-210	
NTC 1,8 kOhm	
LM235Z	
DS18B20	
Optional:	
3-wire-Connection	
4-wire-Connection	

Order example: Radiation sensor with Ni1000 sensor = ASTF/Ni1000

Special models available on demand.

SCREW-IN SENSOR G1/2" - ESF



Application
Our ESF Screw-in Sensor has a G1/2" thread and can be applied in gaseous and liquid media with pressures up to 40 bar. The ESF is used in heating, ventilation, refrigeration and air conditioning applications. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

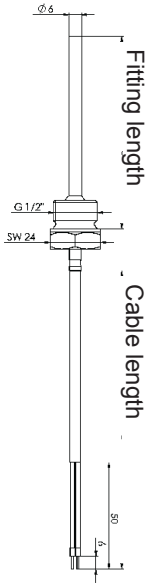
Note: The ESF with glass fibre connection can not be equipped with WPC.

WPC

3 Years Warranty

Technical Data	
Measuring range:	See table
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Core-end sleeves
Power supply cord:	2000 mm PVC (+105 °C), Silicone (+180 °C) or Glass fibre (+400 °C)
Connection thread:	G 1/2", SW27
Material:	stainless steel
Protection class:	IP54
Pressure resistance:	40 bar
Mounting equipment (optional):	Immersion sleeve THVA3

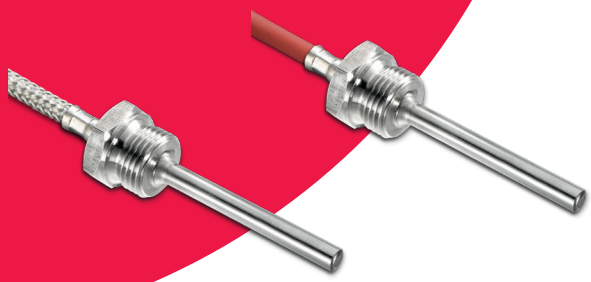
Technical Drawing ESF



Overview (Product Group 1)

Sensor type	Fitting length (PVC-cord max. 105 °C) "P"		Fitting length (Silicone cord max. 180 °C) "S"		Fitting length (Glass fibre cord max. 400 °C) "G"	
	50 mm	100 mm	50 mm	100 mm	50 mm	100 mm
PT100						
PT100 1/3DIN						
PT1000						
PT1000 1/3DIN						
Ni1000						
Ni1000TL5000						
NTC 5k, 10k, 20k, Precon, KTY81-210						
NTC 1,8 kOhm						
LM235Z						
DS18B20						
Optional:						
Per meter supply cord:						

Order example: Screw-In Temperature Sensor with Ni1000 sensor, 100 mm fitting length and 2 m silicone cable = ESF/Ni1000/100/2.0/S
Special models available on demand.



SCREW-IN SENSOR G1/4" - ESF2

Application

Our ESF Screw-in Sensor has a G1/4" thread and can be applied in gaseous and liquid media with pressures up to 40 bar. The ESF is used in heating, ventilation, refrigeration and air conditioning applications. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

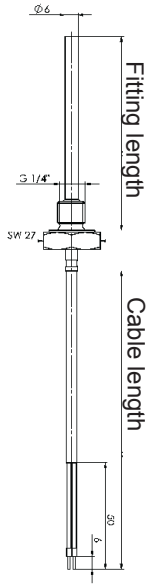
Note: The ESF with glass fibre connection can not be equipped with WPC.

WPC

3 Years Warranty

Technical Data	
Measuring range:	See table
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Core-end sleeves
Power supply cord:	2000 mm PVC (+105 °C), Silicone (+180 °C) or Glass fibre (+400 °C)
Connection thread:	G 1/4", SW27
Material:	stainless steel
Protection class:	IP54
Pressure resistance:	40 bar

Technical Drawing ESF



Overview (Product Group 1)

Sensor Type	Fitting length (PVC-cord max. 105 °C) "P"		Fitting length (Silicone cord max. 180 °C) "S"		Fitting length (Glass fibre max. 400 °C) "G"	
	50 mm	100 mm	50 mm	100 mm	50 mm	100 mm
PT100						
PT100 1/3DIN						
PT1000						
PT1000 1/3DIN						
Ni1000						
Ni1000TL5000						
NTC 5k, 10k, 20k, Precon, KTY81-210						
NTC 1,8 kOhm						
LM235Z						
DS18B20						
Optional:						
Per meter supply cord:						

Bestellbeispiel: Screw-In sensor mit Ni1000-Sensor, 100 mm Fitting length und 2 m Silicone cable = ESF2 / Ni1000 / 100 / 2.0 / S

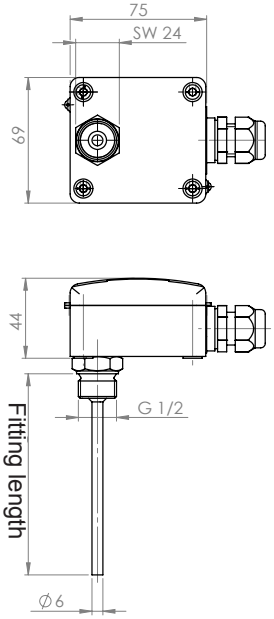
Special models available on demand.

SCREW-IN/IMMERSION TEMPERATURE SENSOR - ENTF

Application
For measuring the temperature of liquid/aggressive and gaseous media. The ENTF is used in heating, ventilation, refrigeration and air conditioning applications. The sensor can easily be mounted to the container or duct to be measured via the G 1/2" terminal thread. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

Technical Data	
Measuring range (sensor):	-50 °C … +180 °C - depends on sensor
Tmax. (housing):	+100 °C
Sensor:	on request(see table)
Switching mode:	2-wire connection (Standard)
Connection:	Screw clamps max 1,5 mm²
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Connection Thread:	G 1/2"-SW24
Protection sleeve:	Ø 6 mm stainless steel
Mounting equipment (optional):	Immersion sleeve THVA3

Technical Drawing ENTF



Overview (Product Group 1) Fitting length

Sensor Type	50 mm	100 mm	150 mm	200 mm	300 mm	400 mm
PT100						
PT100 1/3DIN						
PT1000						
PT1000 1/3DIN						
Ni1000						
Ni1000TK5000						
NTC 5k, 10k, 20k, Precon						
NTC 1,8 kOhm						
Optional:						
3-wire-Connection						
4-wire-Connection						

Order example: Immersion Temperature Sensor with Pt100 sensor, 50 mm = ENTF/PT100/50
Special models available on demand.

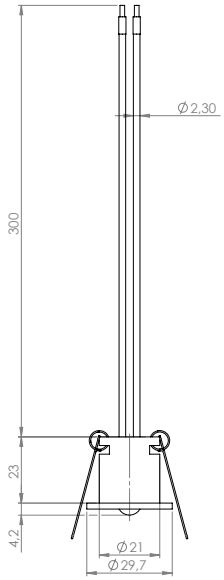
CEILING-MOUNTED TEMPERATURE SENSOR - DEBF

Application
For indoor temperature measuring applications (to be flush-mounted). The sensor features a plain and modern design and is mounted to the ceiling with the help of two tension springs. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems.

3 Years Warranty

Technical Data	
Measuring range:	-20 °C … +90 °C (Standard)
Sensor:	on request(see table)
Power supply cord:	0,3 m PVC 2 x 0,25 mm² (Standard)
Switching mode:	2-wire connection (Standard)
Protection class:	IP20

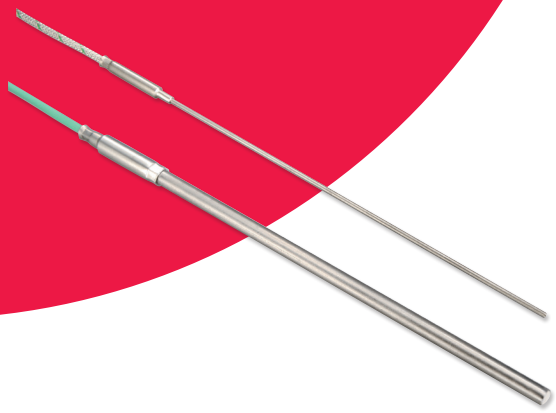
Technical Drawing DEBF



Overview (Product Group 1)

Sensor Type	0,3 m PVC
PT100	
PT100 1/3DIN	
PT1000	
PT1000 1/3DIN	
Ni1000	
Ni1000TK5000	
NTC 5k, 10k, 20k, Precon	
NTC 1,8 kOhm	

Order example: Ceiling-mounted sensor with Ni1000 sensor = DEBF/Ni1000
Special models available on demand.



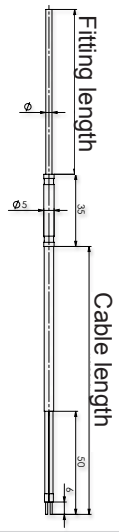
SHEATH THERMOCOUPLE - MTE

Application

For temperature Measurements between -220 and +1150°C in liquid or gaseous media. Because of their special interior design with magnesium oxide, thermocouple elements can be used for applications with high pressure and vibrations while guaranteeing a long life span. Sheath Thermocouples are bendable and have a fast response time. The MTEs are installed with the help of screw clamps.

Technical Data	
Thermocouple:	NiCr-Ni Type K acc. DIN IEC 584 – isolatedi
Diameter:	1 mm, 1,5 mm, 3 mm or 6 mm
Fitting length:	100 mm, 150 mm, 200 mm, 300 mm, or 500 mm
Material:	Inconel - 2.4816
Connective sleeve::	8 x 40 mm diameter 6 mm , otherwise 5 x 35 mm
Power supply cord:	Glass-fibre cord, stainless steel coating 2 x 0,22 mm²
Length of supply cord:	2.000 mm (Standard)
Terminal connection:	50 mm loose ends with core-end sleeves
Protection class:	IP54
Max. operating temp. MTE:	-220 °C … +1150 °C
Max. operating temp. cord:	-50 °C … +400 °C

Technical Drawing MTE



Overview (Product Group 1) Fitting length

Diameter	100 mm	150 mm	200 mm	300 mm	500 mm
1,0 mm					
1,5 mm					
3,0 mm					
6,0 mm					
Optional:					
Per meter supply cord:					

Order example: Sheath thermocouple ø 3.0mm, fitting length 200 mm, cable length 3000 mm = MTE 3.0/200/3m

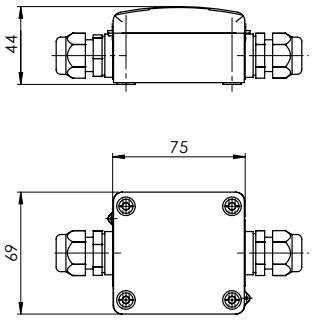
Special models available on demand.

TEMPERATURE MEASURING TRANSDUCER FOR PT1000 - MUG / MIG

Application
The measuring transducer records the temperature via a connected Pt1000 sensor and coverts the value into a standardized analogue output signal in the range between 0-10V/4-20 mA. 24 measuring ranges can be selected and adjusted with the help of a DIP switch. The offset can be corrected by ±5K using the potentiometer.

Technical Data	
Power supply:	12 … 34 VAC/VDC
Analogue output burden (4...20 mA)	50...500 Ohms (at 4 … 20 mA)
Analogue output load:	10 ... 100 kOhms (at 0 … 10 V)
Power input at 0 … 10 V:	20 mA
Power input at 4 … 20 mA:	24 … 44 mA
Accuracy:	± 0,2 K + max 3% fullscale
Measuring range:	24 measuring ranges available
Operating temperature MUF:	-30 °C … +70 °C
Required temperature sensor:	PT1000 DIN EN 60751, Kl. B (2-wire)
Connection:	Screw clamps max. 1.5 mm²
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG
Connection:	3-wire (at 4-20 mA optional 2-wire)

Technical Drawing



Measuring range						Measuring range					
Measuring range °C	1	2	3	4	5	Measuring range °C	1	2	3	4	5
-100 °C to +50 °C	OFF	OFF	OFF	OFF	OFF	-10 °C to +120 °C	OFF	OFF	ON	ON	OFF
-50 °C to 0 °C	ON	OFF	OFF	OFF	OFF	0 °C to +40°C	ON	OFF	ON	ON	OFF
-50 °C to +50 °C	OFF	ON	OFF	OFF	OFF	0 °C to +50 °C	OFF	ON	ON	ON	OFF
-50 °C to +150 °C	ON	ON	OFF	OFF	OFF	0 °C to +70 °C	ON	ON	ON	ON	OFF
-30 °C to +20 °C	OFF	OFF	ON	OFF	OFF	0 °C to +100 °C	OFF	OFF	OFF	OFF	ON
-30 °C to +60 °C	ON	OFF	ON	OFF	OFF	0 °C to +150 °C	ON	OFF	OFF	OFF	ON
-30 °C to +70 °C	OFF	ON	ON	OFF	OFF	0 °C to +160 °C	OFF	ON	OFF	OFF	ON
-20 °C to +50 °C	ON	ON	ON	OFF	OFF	0 °C to +200 °C	ON	ON	OFF	OFF	ON
-20 °C to +80 °C	OFF	OFF	OFF	ON	OFF	0 °C to +250 °C	OFF	OFF	ON	OFF	ON
-20 °C to +120 °C	ON	OFF	OFF	ON	OFF	0 °C to +400 °C	ON	OFF	ON	OFF	ON
-20 °C to +150 °C	OFF	ON	OFF	ON	OFF	0 °C to +600°C	OFF	ON	ON	OFF	ON
-10 °C to +15 °C	ON	ON	OFF	ON	OFF	+10 °C to +35 °C	ON	ON	ON	OFF	ON

Overview (Product Group 1)

Measuring transducer	
MIG (4-20 mA)	
MUG (0 - 10 V)	
Relay	

Order example: Temperature Measuring Transducer with 4-20 mA output signal = MIG
Special models available on demand.

NEW!

3 Years Warranty

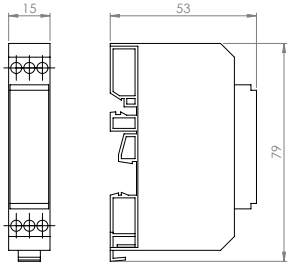
DIN-RAIL MEASURING TRANSDUCER FOR PT1000 - MUF-HS

Application

Our measuring transducer MUF-HS records the temperature via a connected Pt1000 sensor and converts the value into a standardized analogue output signal in the range between 0-10V/4-20 mA. The transmitter has an EMG housing and the Pt1000 can be connected by 2- or 3-wire. 24 measuring ranges can be selected and adjusted with the help of a DIP switch. On request additional options can be offered. Offset can be corrected by ±8°K using the potentiometer.

Technical Data	
Power supply:	12 … 34 V AC/VDC
Analogue output burden (4...20 mA)	50...500 Ohmss
Analogue output load (0...10 V)	10 ... 100 kOhms
Power input at 0 … 10 V:	20 mA
Power input at 4 … 20 mA:	24 … 44 mA
Accuracy:	± 0,2 K + max 3% fullscale
Measuring range:	24 measuring ranges available
Operating temperature MUF:	-30 °C … +70 °C
Required temperature sensor:	PT1000 DIN EN 60751, Class B (2-wire)
Connection:	Screw clamps max. 1.5 mm²
Housing Material:	Polycarbonat PC-F
Measurements Housing:	15 x 75 x 53 mm
Protection class:	IP65
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG
Connection:	3-wire (at 4-20 mA optional 2-wire)

Technical Drawing MUF-HS



Measuring range						Measuring range					
Measuring range °C	1	2	3	4	5	Measuring range °C	1	2	3	4	5
-100 °C to +50 °C	OFF	OFF	OFF	OFF	OFF	-10 °C to +120 °C	OFF	OFF	ON	ON	OFF
-50 °C to 0 °C	ON	OFF	OFF	OFF	OFF	0 °C to +40°C	ON	OFF	ON	ON	OFF
-50 °C to +50 °C	OFF	ON	OFF	OFF	OFF	0 °C to +50 °C	OFF	ON	ON	ON	OFF
-50 °C to +150 °C	ON	ON	OFF	OFF	OFF	0 °C to +70 °C	ON	ON	ON	ON	OFF
-30 °C to +20 °C	OFF	OFF	ON	OFF	OFF	0 °C to +100 °C	OFF	OFF	OFF	OFF	ON
-30 °C to +60 °C	ON	OFF	ON	OFF	OFF	0 °C to +150 °C	ON	OFF	OFF	OFF	ON
-30 °C to +70 °C	OFF	ON	ON	OFF	OFF	0 °C to +160 °C	OFF	ON	OFF	OFF	ON
-20 °C to +50 °C	ON	ON	ON	OFF	OFF	0 °C to +200 °C	ON	ON	OFF	OFF	ON
-20 °C to +80 °C	OFF	OFF	OFF	ON	OFF	0 °C to +250 °C	OFF	OFF	ON	OFF	ON
-20 °C to +120 °C	ON	OFF	OFF	ON	OFF	0 °C to +400 °C	ON	OFF	ON	OFF	ON
-20 °C to +150 °C	OFF	ON	OFF	ON	OFF	0 °C to +600°C	OFF	ON	ON	OFF	ON
-10 °C to +15 °C	ON	ON	OFF	ON	OFF	+10 °C to +35 °C	ON	ON	ON	OFF	ON

Overview (Product Group 1)

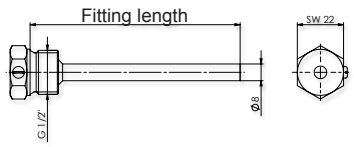
Measuring transducer	
MUF-HS-I-PT1000 (4-20 mA)	
MUF-HS-U-PT1000 (0 - 10 V)	

Order example: DIN-Rail measuring transducer with output signal 4-20 mA = MUF-HS-I-PT1000

Special models available on demand.

ACCESSORIES

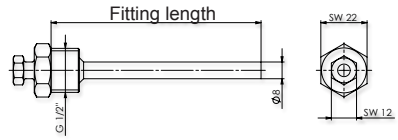
Technical Drawing THMS



Brass immersion sleeves THMS

Fitting dimensions:	see Technical Drawing
Fitting length:	50 / 100 / 150 / 200 / 250 / 300 / 350 / 400 mm
Material:	Galvanized brass
Thread socket:	G1/2" DIN EN10226-1 (tapered)
Width across flats:	SW22
Max. operating temperature:	+160 °C
Pressure range:	up to 16 bar, static

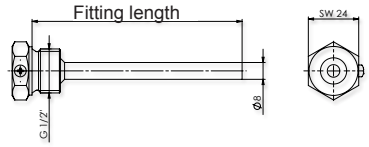
Technical Drawing THMS2



Brass immersion sleeves THMS2 with pressure screw

Fitting dimensions:	see Technical Drawing
Fitting length:	50 / 100 / 150 / 200 / 300 / 400 mm
Material:	Galvanized brass
Thread socket:	G1/2" DIN EN10226-1 (tapered)
Width across flats:	SW22
Pressure screws (incl. silicone gasket)	SW12
Max. Operating temperature:	+160 °C
Pressure range:	up to 16 bar static

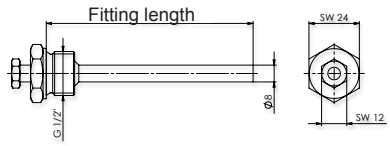
Technical Drawing THVA



Stainless steel immersion sleeve THVA

Fitting dimensions:	see Technical Drawing
Fitting length:	50 / 100 / 150 / 200 / 250 / 300 / 350 / 400 mm
Material:	Stainless steel 1.4571
Thread socket:	G1/2" DIN 2999
Width across flats:	SW27
Max. Operating temperature:	+400 °C
Pressure range:	up to 40 bar static

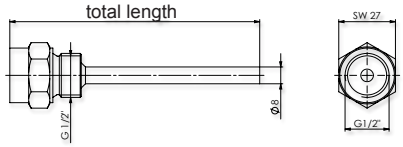
Technical Drawing THVA2



Stainless steel immersion sleeve THVA2 welded, with pressure screw andclamp ring

Fitting dimensions:	see Technical Drawing
Fitting length:	50 / 100 / 150 / 200 / 300 / 400 mm
Material:	Stainless steel 1.4571
Thread socket:	G1/2"
Width across flats:	SW24
Pressure screws (incl. silicone gasket)	SW12
Max. Operating temperature:	+160 °C
Pressure range:	up to 40 bar static

Technical Drawing THVA3



Stainless steel immersion sleeve THVA3 welded, with G1/2" Inside-and-connective thread

Fitting dimensions:	see Technical Drawing
Total lengths:	54 / 104 / 154 / 204 / 304 / 404 mm
Material:	Stainless steel 1.4571
Thread socket inside/connective:	G1/2"
Width across flats:	SW27
Inner diameter	6,5mm
Max. Operating temperature:	+700 °C
Pressure range:	up to 40 bar static

Overview (Product Group 1)

Fitting length

Type	50 mm	100 mm	150 mm	200 mm	300 mm	400 mm
Immersion sleeve Brass (THMs):						
Immersion sleeve Brass with Pressure screw (THMS2):						
Immersion sleeve Stainless steel (THVA):						
Immersion sleeve Stainless steel with Pressure screw (THVA2):						

Total length

Type	54 mm	104 mm	154 mm	204 mm	304 mm	404 mm
Immersion sleeve Stainless steel (THVA3):						

ACCESSORIES

Compression fittings

Threaded clamps for mounting/sealing temperature sensors and sheath thermocouples.

Material:	stainless steel

The following clamp ring versions are available:

PTFE:	up to 260 °C; Pressure resistance 10 bar
Stainless steel:	up to 400 °C; Pressure resistance 40 bar

(Please note your desired version/temperature range at your order

Overview (Product Group 1)

	Thread	Width across flats					
	G1/4" (1)	19					
Drill hole:			3 mm	4 mm	6 mm	8 mm	
Order Code:			KVG1/4-VA-VA-3.0	KVG1/4-VA-VA-4.0	KVG1/4-VA-VA-6.0	KVG1/4-VA-VA-8.0	
	G1/2" (2)	27					
Drill hole:			3 mm	4 mm	6 mm	8 mm	11 mm
Order Code			KVG1/2-VA-VA-3.0	KVG1/2-VA-VA-4.0	KVG1/2-VA-VA-6.0	KVG1/2-VA-VA-8.0	KVG1/2-VA-VA-11.0
	M8x1 (3)	12					
Drill hole:			1 mm	1,5 mm	2 mm	3 mm	4 mm
Order Code:			KVM8x1-VA-VA-3.0	KVM8x1-VA-VA-1.5	KVM8x1-VA-VA-2.0	KVM8x1-VA-VA-3.0	KVM8x1-VA-VA-4.0

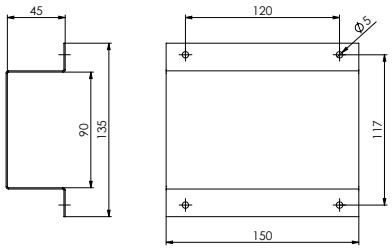
Sun Protection Cover/Physical Impact Protection Cover

Cover to protect outdoor/indoor temperature/humidity sensors against mechanical impact or extreme weather conditions.

Overview (Product Group 1)

Type	
G-25.1	

Technical Drawing G-25.1



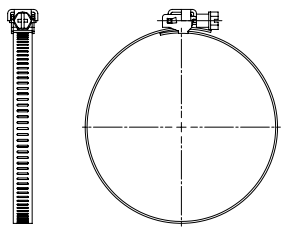
Tension band for contact sensors

For mounting the contact sensors ANTF1 and ANTF2 on drain pipes/pipes

Overview (Product Group 1)

Type	
Z-65 (60-110 mm)	
Z-66 (32-50 mm)	

Tension band Z-65 / Z-66



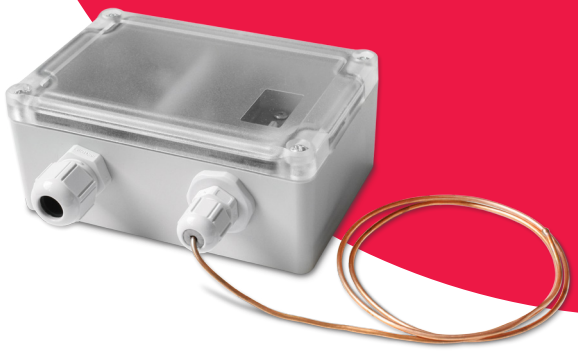
Thermal grease

We recommend the use of thermal grease (3.5 g tube) on contact surfaces to get better response time and accuracy.

Overview (Product Group 1)

Type	
VM-102	

FREEZE-PROTECTION THERMOSTAT - FST - 0,6

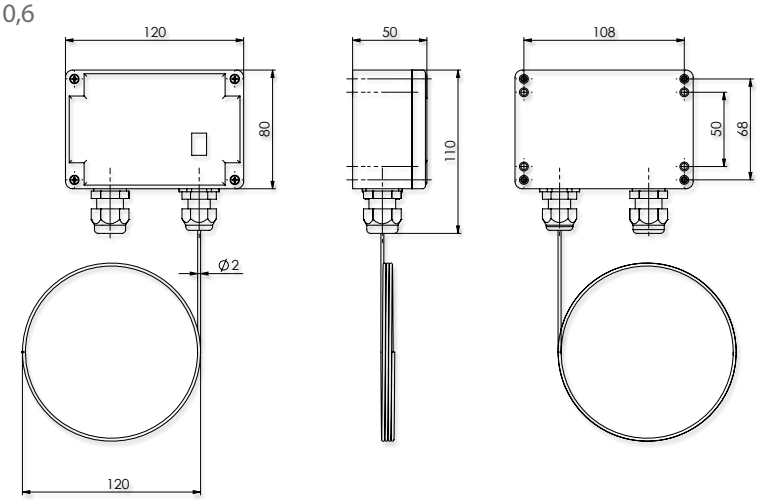


Application

Our FST freeze-protection switch is used for downstream temperature control of water-air heaters in ventilation and air-conditioning system in order to prevent frost damage. The thermostat features a remarkably small differential gap, high reproducability and an automatic reset function.

Technical Data	
Switching capacity:	250 V/AC, 10(6)A; Signal voltage due to the gold-plated connectors
Adjustment range:	-10 °C … +15 °C
Factory setting:	+5 °C
Differential gap:	2 ± 1 K
Reprocudcability:	± 0,5 K
Length of cappillary tube:	600 m
Reset:	automatic
Mounting position:	variable
Electrical connection:	up to 2.5 mm² at microswitch
Cable inlet:	cable glands M16 x 1.5
Protection class:	IP65
Max. Operating temperature:	+70 °C
Min. Operating temperature:	w + min. 2 °C
Storage temperature:	-30 °C … +70 °C

Technical Drawing FST - 0,6



Overview (Product Group 2)

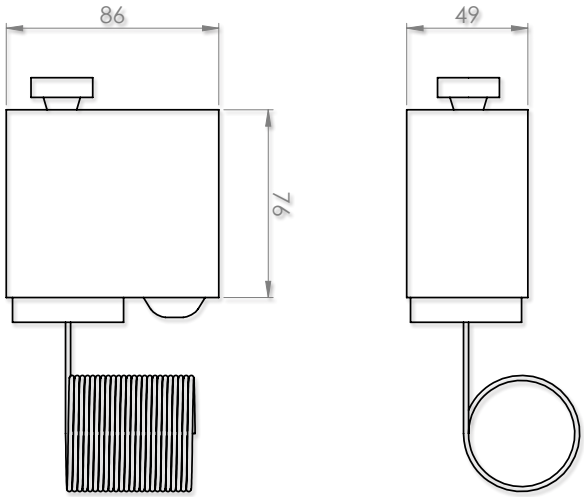
Type	Features	
FST - 0,6	TR, automatic	

FREEZE-PROTECTION THERMOSTAT - FST3 / FST6

Application
Device surveilling hot water heating coils and heat exchangers in ventilation and air-conditioning systems as well as heating appliances. The freeze-protection thermostat prevents water-bearing tanks and heat exchangers from freezing over and is equipped with an automatic reset.

Technical Data	
Switching capacity:	16 A, 250 V open or closed, 1 A, 250 V opposite side
Terminals:	1 common, 2 opens contact at higher temperature. 4 closes contact when temperature rises
Cable inlet:	conductor isolation, 14 mm
Storage temperature:	-30 °C … +55 °C
Installation:	Two threaded holes in the backside of the casing (M4x6, incl.)
Setting:	via hex nut
Housing:	Plastic Noryl SE1, grey cover
Measurements:	86 x 49 x 76 mm
Protection rating:	IP44
Sensor element:	Gas-filled tin-coated copper capillary tube
Temperature/adjustment range:	-18 °C … +13 °C
Accuracy:	± 1,2 °C
Accessories (incl.)	Set of fasteners for the capillaries + mounting bracket

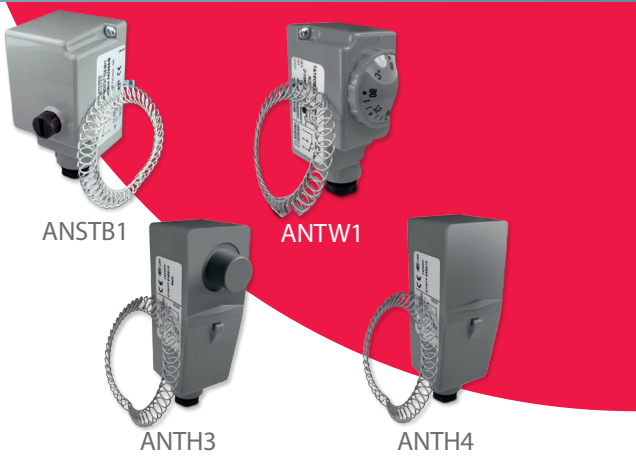
Technical Drawing FST3 / FST6



Overview (Product Group 1)

Type	Description	Features	
FST3	3 m capillaries	automatic reset	
FST6	6 m capillaries	automatic reset	
FST3.1	3 m capillaries	manual reset	
FST6.1	6 m capillaries	manual reset	

CONTACT SAFETY TEMPERATURE LIMITER/MONITOR/THERMOSTAT

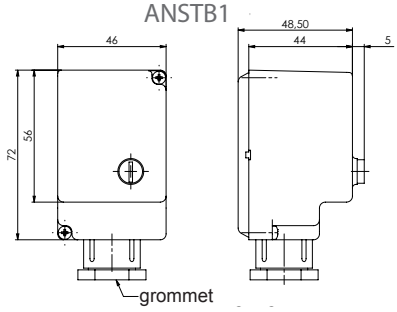


Application
The type AN Contact Sensors are suited for temperature control and adjustment in pipes/drain pipes.

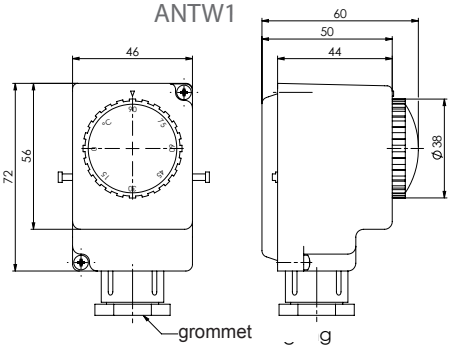
Technical Data	ANSTB1	ANTW1	ANTH3	ANTH4
	Contact safety temperature limiter	Contact safety temperature-monitor	Contact safety temperature thermostat with ext. controls	Contact safety tempreature thermostat with int. controls
Preset limiting temperature:	+60 °C			
Limiting temperature range:	+40 °C … +70 °C	0 °C … +90 °C	+20 °C … +90 °C	+20 °C … +90 °C
Tolerance:	0 … 10 K	± 5 K	8 ± 3 K	8 ± 3 K
Reset temperature:	Resolution at 25 K ± 8 K			
Differential:		10 ± 3 K	8 ± 3 K	8 ± 3 K
Protection rating:	IP40	IP40	IP 30	IP 30
Insulation rating:	I	I	I	I
Temperature gradient:	<1 K / min.	<1 K / min.	<1 K / min.	<1 K / min.
Max. head temperature:	+55 °C	+55 °C	+85 °C	+85 °C
Max. sensor temperature:	+125 °C	+125 °C		
Storage temperature:	-15 °C … +60 °C	-15 °C … +60 °C	-15 °C … +60 °C	-15 °C … +60 °C

Technical Drawing

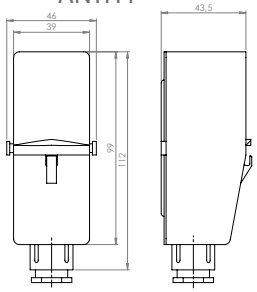
ANSTB1



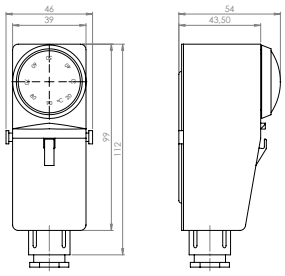
ANTW1



ANTH4



ANTH3



Overview (Product Group 1)

Type	Adjustment/Reset	
ANSTB1	external	
ANTW1	external	
ANTH3	external	
ANTH4	internal	

IRTH1

RTH1

INDUSTRIAL INDOOR THERMOSTAT - IRTH1 / INDOOR THERMOSTAT - RTH1

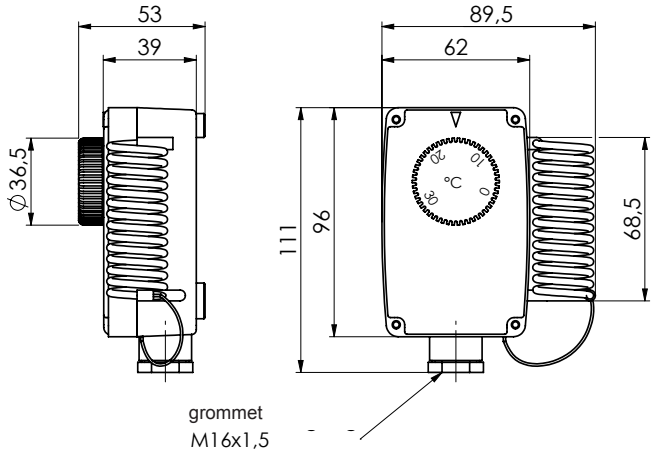
Application

The Thermostats IS suited for indoor temperature control and adjustment. Because of its higher protection class, the IRTH 1 can be applied for industrial purposes.

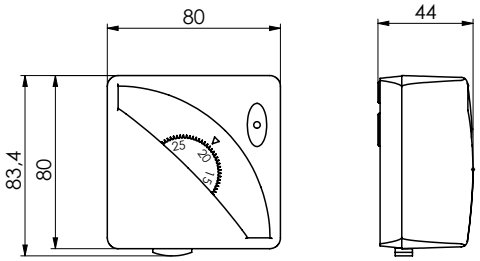
Technical Data	IRTH1	RTH1
	Industrial indoor thermostat	Indoor thermostat
Adjustment range:	-5 °C … +35 °C ± 2 °C	-5 °C … +30 °C
Differential gap:	Δ t 2 ± 1 K	Δ t < 1 K
Max. Temperature housing:	+50 °C	+50 °C
Max. Temperature capillaries:	+50 °C	-
IP Protection class:	IP 54	IP 20
Contact load:	C1 16 (2,5) A / 250 V C2 6 (2,5) V	NA 16 (2,5) 250 V NC 16 (2,5) 250 V

Technical Drawing

IRTH1



RTH1



Overview (Product Group 1)

Type	Switchpoint - Adjustment	
IRTH1	external	
RTH1	external	

REMOTE SENSOR, SINGLE-LEVEL - KTTH

KTTH1

KTTH2

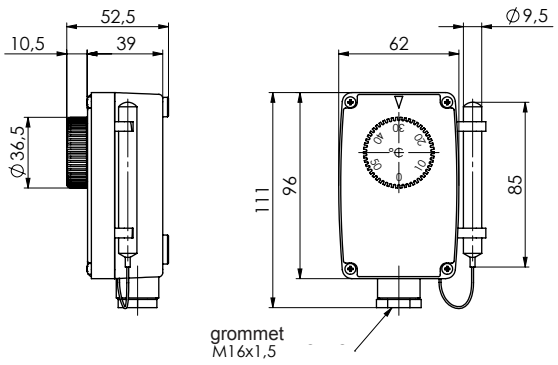
Application

The Thermostats are suited for temperature control and adjustment indoors as well as in pipes/drain pipes (in combination with an immersion sleeve).

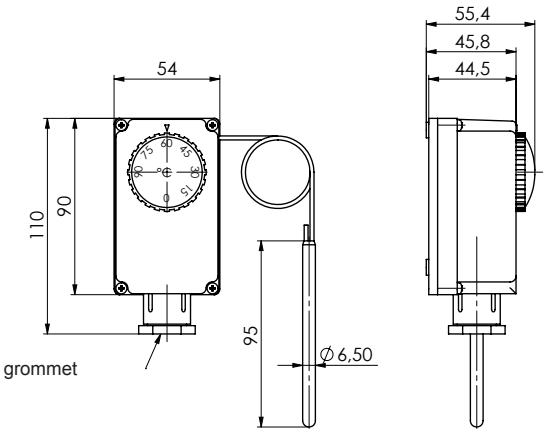
Technical Data	KTTH1	KTTH2
Adjustment range:	0 °C … +55 °C ± 2 °C	0 °C … +90 °C ± 3 °C
Differential gap:	Δ t 3 K ± 1 K	Δ t 4 °C ± 1 °C
Max. Temperatur housing:	85 °C	80 °C
Max. Temperatur capillaries:	60 °C	150 °C
Protection class:	IP54	IP40
Contact load:	C1 16(6) A / 250 V C2 6(4) A / 250 V	C1 10(2,5) A NC / 250 V C2 6(2,5) A NA / 250 V
Length of capillaries:		1000 mm
Immersion sleeve, brass R 1/2":		7 x 8 x 100 mm

Technical Drawing

KTTH1



KTTH2



Overview (Product Group 1)

Type	Switchpoint - Adjustment	
KTTH1	external	
KTTH2	external	

IMMERSION THERMOSTAT - TSTB1 / DTTH1 / TTH1 / TTH1.1

TSTB1 DTTH1 TTH1 TTH1.1

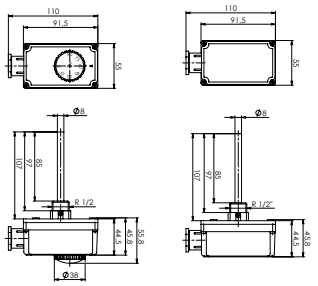
Application

The assortment of switching immersion thermostats TTH1, is specially designed to guarantee an optimal control and adjustment of temperature behavior inner pipes and drain pipes.

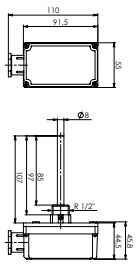
Technical Data	TSTB1	DTTH1	TTH1	TTH1.1
	Safety Temperature Limiter	Double Thermostat	Control Thermostat	Control Thermostat
Temperature adjustment range:	+90 °C … +110 °C	Controller 0 °C … +90 °C, Limiter +90 °C … +110 °C	0 °C … +90 °C	0 °C … +90 °C
Tolerance:	-6 K / -15 K (acc. model)	Controller ± 5 K, Limiter -15 K; -6 K (acc. model)	± 5 K	± 5 K
Differential:	25 ± 8 K / 15 ± 8 K (acc. model)	Controller 6 ± 2 K; 4 ± 1 K (acc. model), Limiter 25 ± 8 K; 15 ± 8 K (acc. model)	6 ± 2 K	6 ± 2 K
Reset:	manual	manual und automatic	-	-
Protection class:	IP 40	IP 40	IP 40	IP 40
Insulation class:	I	I	I	I
Temperature gradient:	<1 K/min.	<1 K/min.	<1 K/min.	<1 K/min.
Max. start temperature:	+80 °C	+80 °C	+80 °C	+80 °C
Max. sensor temperature:	+125 °C	+125 °C	+125 °C	+125 °C
Storage temperature:	-15 °C … +55 °C	-15 °C … +55 °C	-15 °C … +55 °C	-15 °C … +55 °C
Max. envelope pressure:	10 bar	10 bar	10 bar	10 bar
Response time:	>1'	<1'	<1'	<1'
Load at contacts	C-1: 0,5 A / 250 VAC C-2: 10 (2,5) A / 250 VAC	C-1 REG.: 10 (2,5) A / 250 VAC C-2 REG.: 6 (2,5) A / 250 VAC C-1 LIM.: 0,5 A / 250 VAC C-2 LIM.: 10 (2,5) A / 250 VA	C-1: 10 (2,5) A / 250 VAC C-2: 6 (2,5) A / 250 VAC	C-1: 10 (2,5) A / 250 VAC C-2: 6 (2,5) A / 250 VAC
Cable inlet:	M20 x 1,5	M20 x 1,5	M20 x 1,5	M20 x 1,5
Immersion sleeve, brass R1/2":	7 x 8 x 120 mm	15 x 16 x 100 mm	7 x 8 x 100 mm	7 x 8 x 100 mm

Technical Drawing

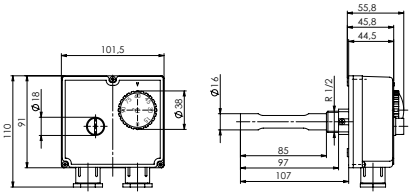
TTH1 / TTH1.1



TSTB1



DTTH1



Overview (Product Group 1)

Type	Model	
TSTB1	Safety Temperature Limiter	
DTTH1	Double Thermostat	
TTH1	Control Thermostat	
TTH1.1	Control Thermostat	

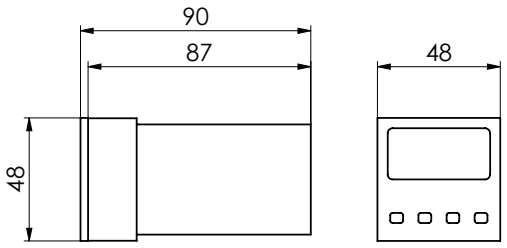
PID-CONTROLLER - ETC4420

Application

The Temperature Controller ETC4420 is equipped with ON/OFF function or PID control with self-adjustment. Actual and set value can be displayed simultaneously. Additionally, the ETC4420 is equipped with a soft start function (ramp function) and a security code function to prevent unauthorized value adjustment. Measuring input for 2/3-wire connection with Pt100 or thermocouples type J, K, T, S and R. The horizontal and vertical menu navigation allow for easy and intuitive operation.

Technical Data	
Power supply:	230 VAC / Optional 9 … 30 VDC or 7 … 24 VAC
Power consumption:	max. 5 VA
Input (sensor):	PT100, Thermocouple Typ J, K, T, S, R
Resolution:	0,1 °C
Accuracy :	± 0,2% full scale:
Output:	
AL2 controller output:	Relay: Changeover contact 250 V/AC / 2A
AL1 alarm output:	Relay: Make contact 250 V/AC / 2A
SSR output:	max. 12 V / 20 mA
Relay life span:	Switching Operations: 30 Mio. without load / 300,000 at 250 VAC / 2A
Control type:	ON/OFF setting / P, PI, PD, PID
Measurements:	48 x 48 x 94 mm
Protection class:	Front IP65 - Rear IP20

Technical Drawing TR-ETC4420



Features

- Soft start (ramp function)
- RS-485 interface with ModBus protocol (optional)
- Control output adjustable as relay or SSR output
- Relay output adjustable as 2nd alarm or as control output
- AL1 as alarm output
- Switching between heating and cooling function
- Offset adjustment for input parameter
- Periodical switching mode of the output adjustable at sensor break
- Parameter protection against unauthorized access
- Prorgrammable via buttons or ModBus protocol

Overview (Product Group 2)

Type	Description	
ETC4420-SM (9 … 30 VDC bzw. 7 … 24 VAC)		
ETC4420-RS	with RS485 interface	
ETC4420	without RS485 interface	

Special models available on demand.

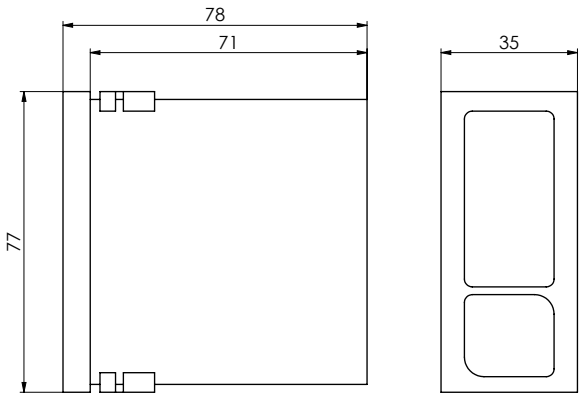
PID-TEMPERATURE CONTROLLER - TR-ET2011

Application

Digital adjustable thermostat for heating and cooling applications. Conveniently operable via the front buttons. With adjustable hysteresis, set value and off-set function. Depending on the model, the controller is available with input signals Pt100 or type J and K thermocouples.

Technical Data	
Power supply:	230 VAC / optional: 9-30VDC
Power consumption:	max. 5 VA
Input (sensor):	Type J or K thermocouples or Pt100 (please specify at order)
Scale:	Type J and K thermocouples: 0°C...+600°C / PT100: -100°C...+600°C
Resolution:	1 °C
Accuracy:	+/- 0,5°C full scale
Switching output:	Relay, Changeover contact
Reference Value adjustment:	1 set value setting
Control response:	ON/OFF switching mode
Hysteresis:	Adjustable between +1°C and +20°C
Housing:	Switchboard installation (DIN43700), mounting equipment
Measurements:	35 x 77 x 71 mm
Display:	4 digits

Technical Drawing TR-ET2011



Overview (Product Group 2)

Sensor input/Power supply	Order code	
Fe-CuNi Typ J / NiCr-Ni Typ K / 230V	ET2011-JK-230	
Fe-CuNi Typ J / NiCr-Ni Typ K / 24V	ET2011-JK-SM	
PT100 / 230V	ET2011-RT-230	
PT100 / 24V	ET2011-RT-SM	

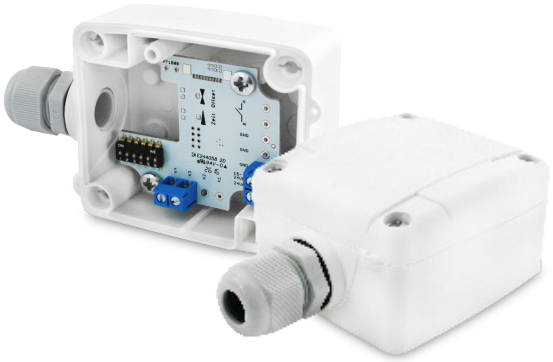
Special models available on demand.


TEMPERATURE ACTIVE

ACTIVE TEMPERATURE SENSORS WITH OUTPUT 0-10 V AND 4-20 MA

Industrial and building engineering environment often requires active temperature sensors due to long cableways. Below you will find our entire range of active temperature sensors with an standardized signal output of 0...10 V or 4...20 mA.

Our latest developed temperature measuring transducers with an accuracy of 0.3 Kelvin are easily able to be setted to individual requirements, thanks the adjustability of 24 different measuring ranges. The off-set can be adjusted by +/- 8 Kelvin with the help of a potentiometer.



TEMPERATURE ACTIVE

ACTIVE TEMPERATURE SENSOR
WITH OUTPUT 0-10V OR 4-20MA

In industrial or building services environment, active temperature sensors are required due to long cable paths. We offer our entire temperature measurement Technical Portfolio with 0 ... 10V or 4 ... 20mA output. Our temperature transmitters with an accuracy of 0.3 ° C, offer customers the opportunity to choose a temperature range with a dip switch. A potentiometer offset can be set manually by +/- 1 Kelvin.

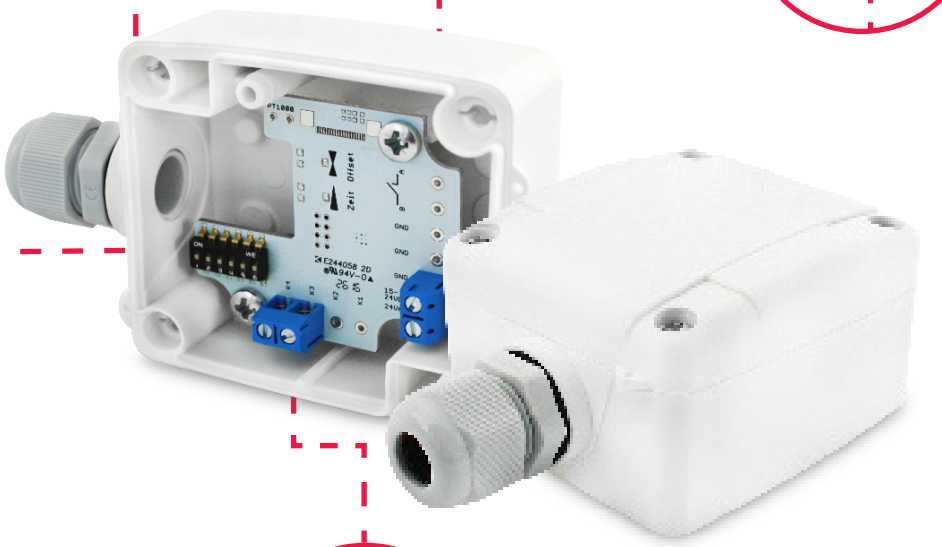
In order to meet the wide range of requirements of our proven temperature sensors, while ensuring a high level of functionality and ease of use, we have revised our portfolio of active temperature measuring instruments for space equipment. The sensor system was easily sold to increase the measurement accuracy, in addition there is the option of a relay output and potentiometer in passive and active design.

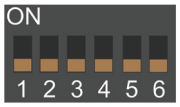
EASY ASSEMBLING

PLAIN, BUT STILL A KIND OF UNIQUE
EASY MOUNTABLE // STURDY // SAFE

+/- 8 Kelvin adjustable
via potentiometer

Accuracy
0,2 K + 3% full
scale





24 Measuring ranges
settable via DIP-Switch

0-10V
OR
4-20mA

PT1000 TEMPERTURE MEASURING TRANSDUCER WITH HOUSING - MUG / MIG

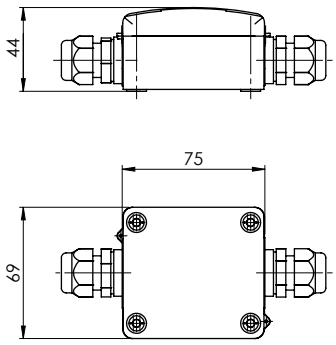
3 Years Warranty

Application

The measuring transducer records the temperature via a connected Pt1000 sensor and coverts the value into a standardized analogue output signal in the range between 0-10V/4-20 mA. 24 measuring ranges can be selected and adjusted with the help of a DIP switch. The offset can be corrected by ±5K using the potentiometer.

Technical Data	
Power supply:	12 … 34 V AC/VDC
Analogue output burden (4 … 20 mA):	50...500 Ohms
Analogue output load (0 … 10 V):	10 ... 100 kOhms
Power input (4 … 20 mA):	24 … 44 mA
Power input (0 … 10 V):	20 mA
Accuracy:	± 0,2 K + max 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature MUF:	-30 °C … +70 °C
Required temperature sensor:	PT1000 DIN EN 60751, Class B (2-wire)
Connection:	Screw clamps max. 1.5mm²
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG
Connection:	3-wire (Standard) (4...20 mA: optional 2-wire

Technical Drawing



Overwiew Measuring ranges

Measuring range °C	1	2	3	4	5	Measuring range °C	1	2	3	4	5
-100 °C to +50 °C	OFF	OFF	OFF	OFF	OFF	-10 °C to +120 °C	OFF	OFF	ON	ON	OFF
-50 °C to 0 °C	ON	OFF	OFF	OFF	OFF	0 °C to +40°C	ON	OFF	ON	ON	OFF
-50 °C to +50 °C	OFF	ON	OFF	OFF	OFF	0 °C to +50 °C	OFF	ON	ON	ON	OFF
-50 °C to +150 °C	ON	ON	OFF	OFF	OFF	0 °C to +70 °C	ON	ON	ON	ON	OFF
-30 °C to +20 °C	OFF	OFF	ON	OFF	OFF	0 °C to +100 °C	OFF	OFF	OFF	OFF	ON
-30 °C to +60 °C	ON	OFF	ON	OFF	OFF	0 °C to +150 °C	ON	OFF	OFF	OFF	ON
-30 °C to +70 °C	OFF	ON	ON	OFF	OFF	0 °C to +160 °C	OFF	ON	OFF	OFF	ON
-20 °C to +50 °C	ON	ON	ON	OFF	OFF	0 °C to +200 °C	ON	ON	OFF	OFF	ON
-20 °C to +80 °C	OFF	OFF	OFF	ON	OFF	0 °C to +250 °C	OFF	OFF	ON	OFF	ON
-20 °C to +120 °C	ON	OFF	OFF	ON	OFF	0 °C to +400 °C	ON	OFF	ON	OFF	ON
-20 °C to +150 °C	OFF	ON	OFF	ON	OFF	0 °C to +600°C	OFF	ON	ON	OFF	ON
-10 °C to +15 °C	ON	ON	OFF	ON	OFF	+10 °C to +35 °C	ON	ON	ON	OFF	ON

Overview (Product Group 1)

Type	
MIG (4-20 mA)	
MUG (0-10 V)	
Relay	

Order example: Temperature transmitter with outputssignal 4-20 mA = MIG

CABLE/SURFACE TEMPERATURE SENSOR - KBTF / MU

Application

Apparatus for measuring the temperature in gaseous media. In combination with an immersion sleeve, the KBTF can also be used for measuring the temperature of liquid media (as in pipes, kettles or water tanks). With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems. The versions with PVC and silicone connections feature a double roller-burnished sleeve as standard. The fibre glass/VA version is hexagon-shaped. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

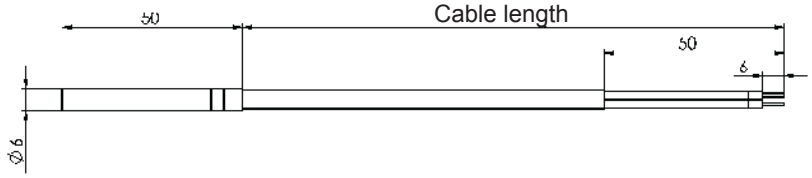
Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Analogue output burden (0...10 V)	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4-20 mA: optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	See table
Temperature sensor:	Pt1000 Class B (2-wire)
Length supply cord:	2 meters (Standard)
Connection:	Screw clamps, max 1.5 mm²
Protection sleeve:	Ø6 x 50 mm stainless steel
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (optional):	Immersion sleeve, Screw clamps

Further details regarding the measuring transducer available on page 74.

Technical Drawing KBTF / MU



Overview (Product Group 1)

Type	Output	PVC up to 105 °C	Silicone up to 180 °C	Silicone HT up to 250°C	Glass fibre up to 400 °C
KBTF / MUV / P	0 ... 10V	x			
KBTF / MUV / S	0 ... 10V		x		
KBTF / MUV / T	0 ... 10V			x	
KBTF / MUV / G	0 ... 10V				x
KBTF / MUA / P	4 ... 20 mA	x			
KBTF / MUA / S	4 ... 20 mA		x		
KBTF / MUA / T	4 ... 20 mA			x	
KBTF / MUA / G	4 ... 20 mA				x

Optional	PVC	Silicone	Silicone HT	Glass fibre
Power supply cord/meter				
Display				
Relay				

Order example: Cable-type Temperature sensor with silicone cable and 4-20 mA output signal = KBTF/MUA/S

Special models available on demand.

IMMERSION TEMPERATURE SENSOR WITH FLEXIBLE SILICONE CONNECTION - KBTFL / MU

Application

Apparatus for measuring the temperature in gaseous media. In combination with an immersion sleeve, the KBTFL can also be used for measuring the temperature of liquid media (as in pipes, kettles or water tanks). The KBTFL is well-suited for immersion applications thanks to the 200 mm sleeve. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

WPC

3 Years Warranty

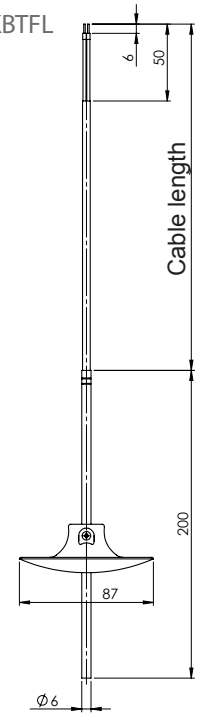
Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 VAC/VDC
Power supply (0...10 V):	12-34 VAC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V) (0...10 V):	10...100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	See table
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Protection sleeve:	Ø6 x 200 mm stainless steel
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (optional):	Immersion sleeve, Screw clamps

Further details regarding the measuring transducer available on page 74.

Technical Drawing KBTFL



Overview (Product Group 1)

Type	Output	
KBTFL / MUV	0 ... 10 V	
KBTFL / MUA	4 ... 20 mA	

Optional	
Power supply cord: per meter	
Display	
Relay	

Order example: Immersion Temperature Sensor with 0-10 V output signal = KBTFL/MUV

Special models available on demand.

INDOOR PENDULUM SENSOR - RPF / MU

Application

For indoor temperature measuring applications. The sensor is suspended from above, making it especially suitable for temperature Measurements in large rooms and halls with a high ceiling. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

WPC

3 Years Warranty

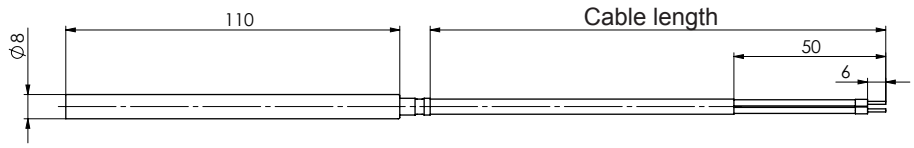
Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 VAC/VDC
Power supply (0...10 V):	12-34 VAC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	-35 °C ... +105 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Protection sleeve:	Ø8 x 110 mm stainless steel
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP54

Further details regarding the measuring transducer available on page 74.

Technical Drawing RPF



Overview (Product Group 1)

Type	Output	Cord length	
RPF / MUV / 2.0	0 ... 10 V	2 m	
RPF / MUV / 5.0	0 ... 10 V	5 m	
RPF / MUV / 10.0	0 ... 10 V	10 m	
RPF / MUA / 2.0	4 ... 20 mA	2 m	
RPF / MUA / 5.0	4 ... 20 mA	5 m	
RPF / MUA / 10.0	4 ... 20 mA	10 m	

Optional	
Display	
Relay	

Order example: Indoor Pendulum Sensor with 2 meter cord and 4-20 mA output signal = RPF/MUA/2.0

Special models available on demand.

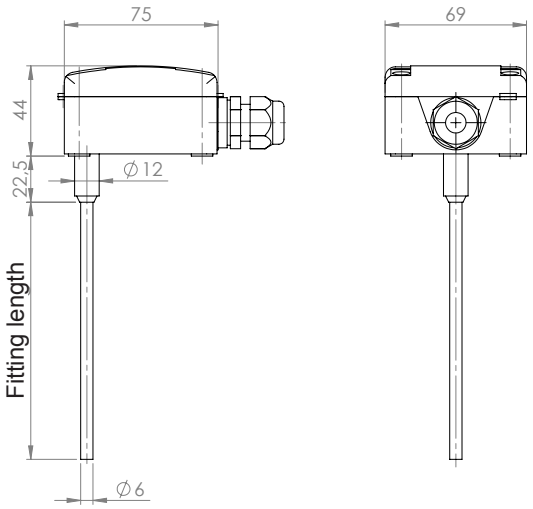
DUCT/IMMERSION TEMPERATURE SENSOR - KNTF / MU

Application

Our Duct/Immersion temperature sensors are equipped with dew -point resistance by default. In combination with an immersion sleeve, the KNTF can also be used for measuring the temperature of liquid/non-aggressive media. Gaseous media may be measured with help of our monuting flange MF. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data	
Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 VAC/VDC
Power supply (0...10 V):	12-34 VAC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C … +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG
Temperature Sensor	
Measuring range (head):	-50 °C … +180 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Protection sleeve:	Ø6 mm stainless steel
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (optional):	Immersion sleeve, Mounting flange, Screw clamps

Technical Drawing KNTF



Overview (Product Group 1)

Type	Fitting length	Output	Price
KNTF / MUV / 50	50 mm	0 … 10 V	
KNTF / MUV / 100	100 mm	0 … 10 V	
KNTF / MUV / 150	150 mm	0 … 10 V	
KNTF / MUV / 200	200 mm	0 … 10 V	
KNTF / MUV / 300	300 mm	0 … 10 V	
KNTF / MUV / 400	400 mm	0 … 10 V	
KNTF / MUA / 50	50 mm	4 … 20 mA	
KNTF / MUA / 100	100 mm	4 … 20 mA	
KNTF / MUA / 150	150 mm	4 … 20 mA	
KNTF / MUA / 200	200 mm	4 … 20 mA	
KNTF / MUA / 300	300 mm	4 … 20 mA	
KNTF / MUA / 400	400 mm	4 … 20 mA	

Optional							
Mounting flange Z-60.4							
	50 mm	100 mm	150 mm	200 mm	300 mm	400 mm	
Immersion sleeve brass							
Immersion sleeve stainless steel							
Display							
Relay							

Further details regarding the measuring transducer available on page 74.

Order example: Duct Temperature Sensor, fitting length 200 mm with 4-20 mA output signal = KNTF/MUA/200

Special models available on demand.

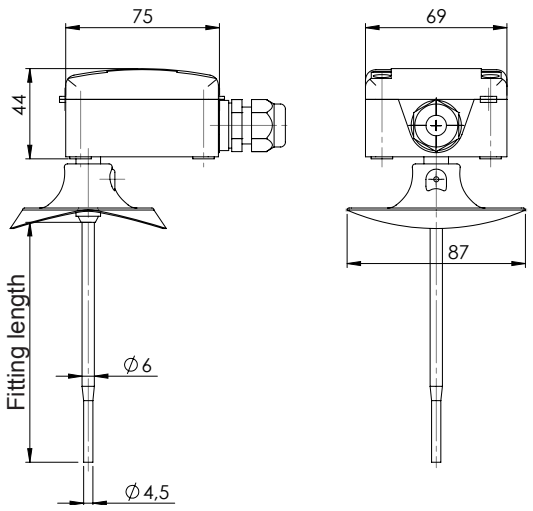
DUCT TEMPERATURE SENSOR (FAST RESPONSE TIME) - KNTFS / MU

Application
For fast duct temperature Measurements. Our Duct Temperature Sensors are equipped with dew point resistance by default. Gaseous media may be measured with help of our mounting flange MF. The KNTFS's fields of application include heating, ventilation and refrigeration engineering as well as air-conditioning. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data

Measuring transducer	Measuring transducer
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 VAC/VDC
Power supply (0...10 V):	12-34 VAC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG
Temperature Sensor	
Measuring range (head):	-50 °C ... +180 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Protection sleeve:	Ø6 mm , tapered to 4.5 mm, stainless steel
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (optional):	Immersion sleeve, Mounting flange, Screw clamps

Technical Drawing KNTFS



Overview (Product Group 1)

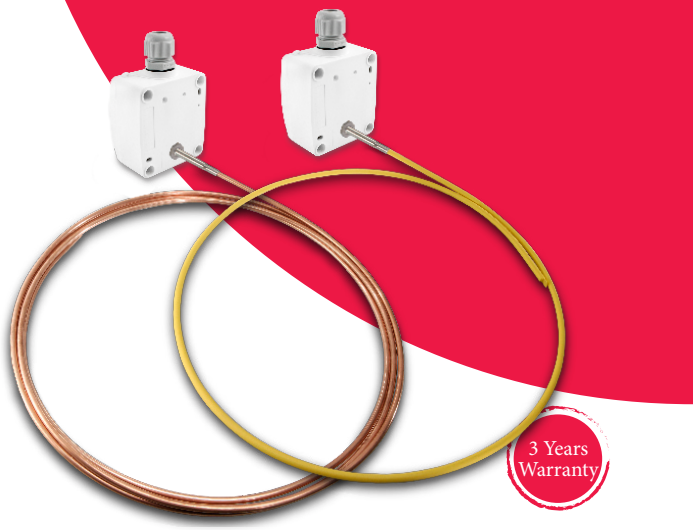
Type	Fitting length	Output	Price
KNTFS / MUV / 50	50 mm	0 ... 10 V	
KNTFS / MUV / 100	100 mm	0 ... 10 V	
KNTFS / MUV / 150	150 mm	0 ... 10 V	
KNTFS / MUV / 200	200 mm	0 ... 10 V	
KNTFS / MUV / 300	300 mm	0 ... 10 V	
KNTFS / MUV / 400	400 mm	0 ... 10 V	
KNTFS / MUA / 50	50 mm	4 ... 20 mA	
KNTFS / MUA / 100	100 mm	4 ... 20 mA	
KNTFS / MUA / 150	150 mm	4 ... 20 mA	
KNTFS / MUA / 200	200 mm	4 ... 20 mA	
KNTFS / MUA / 300	300 mm	4 ... 20 mA	
KNTFS / MUA / 400	400 mm	4 ... 20 mA	

Optional	
Mounting flange Z-60.4	
Display	
Relay	

Further details regarding the measuring transducer available on page 74.

Order example: Duct Temperature Sensor, fitting length 100 mm with 4-20 mA output signal = KNTFS/MUA/100
Special models available on demand.

MEAN VALUE TEMPERATURE SENSOR - MWTF / MU



Application

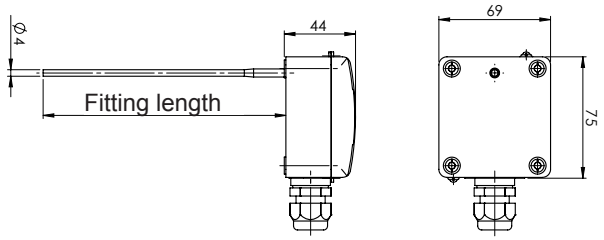
For measuring the temperature in gaseous media (when combined with a mounting flange). The fields of application are heating, ventilation and refrigeration engineering as well as air-conditioning. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12 … 34 V AC/DC
Power supply (0...10 V):	12 … 34 V AC/DC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24 … 44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C … + 70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range (measuring rod):	-30 °C … +80 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Measuring rod:	Copper 4 x 0,5 mm, length see table
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (optional):	Mounting clamp, Mounting flange

Technical Drawing MWTF



Overview (Product Group 1)

Type	Measuring rod	Output	
MWTF / MUV / 3 / B	3 m	0 … 10 V	
MWTF / MUV / 6 / B	6 m	0 … 10 V	
MWTF / MUV / 10 / B	10 m	0 … 10 V	
MWTF / MUV / 3 / S	3 m	0 … 10 V	
MWTF / MUV / 6 / S	6 m	0 … 10 V	
MWTF / MUV / 10 / S	10 m	0 … 10 V	
MWTF / MUA / 3 / B	3 m	4 … 20 mA	
MWTF / MUA / 6 / B	6 m	4 … 20 mA	
MWTF / MUA / 10 / B	10 m	4 … 20 mA	
MWTF / MUA / 3 / S	3 m	4 … 20 mA	
MWTF / MUA / 6 / S	6 m	4 … 20 mA	
MWTF / MUA / 10 / S	10 m	4 … 20 mA	

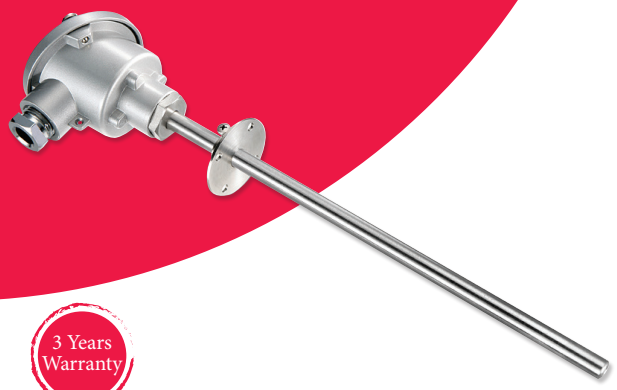
Optional	
Mounting clamp (MK)	
Mounting flange (Z-60.4)	
Display	
Relay	

Model	Code
Blank	B
Shrinked	S

Further details regarding the measuring transducer available on page 74.

Order example: Mean value sensor, 10 m capillary tube, with 0-10 V output signal, blank = MWTF/MUV/10/B

Special models available on demand.



3 Years Warranty

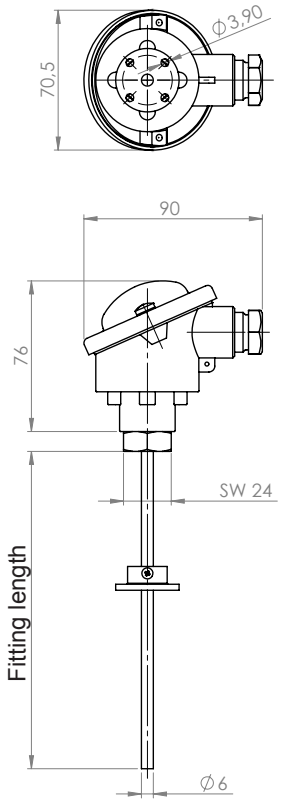
HIGH TEMPERATURE SENSOR - HTFB1 / MU

Application

The HTFB1 is a high temperature sensor with a measuring range of -50°C ... +600°C. The device is equipped with an internal measuring unit and can easily be mounted on the container or duct to be measured (with the mounting flange included in the delivery). The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data	
Power supply (0...10 V):	15 … 35 VDC, 15 … 26 VAC
Power supply (4...20 mA):	10 … 30 VDC
Adjustment range (0 … 10 V) settable via jumper:	-100 °C … 600 °C (12 preset measuring ranges)
Adjustment range (4 … 20 mA) programmable:	-200 °C … +850 °C
Accuracy (0 … 10 V):	0,3% full scale
Accuracy (4 … 20 mA):	0,3% full scale
Sensor:	Pt100 , Class B nach DIN60751
Connection (0 … 10 V):	3-wire
Connection (4 … 20 mA):	2-wire
Housing:	Connective head, B shape, aluminum
Cable inlet:	Screw connection M20 x 1,5
Material protection sleeve:	Stainless steel
Connection/Mounting:	Mounting flange (optional)
Diameter protection sleeve:	6 mm
Protection class:	IP54
Operating temperature sensor:	-50 °C … +600 °C
Electronics/connective head operating temperature:	-40 °C … +85 °C

Technical Drawing HTFB1



Overview (Product Group 1)

Type	Fitting length	Output	Price
HTFB1/MUV/100	100 mm	0 … 10 V	
HTFB1/MUV/200	200 mm	0 … 10 V	
HTFB1/MUV/300	300 mm	0 … 10 V	
HTFB1/MUV/400	400 mm	0 … 10 V	
HTFB1/MUA/100	100 mm	4 … 20 mA	
HTFB1/MUA/200	200 mm	4 … 20 mA	
HTFB1/MUA/300	300 mm	4 … 20 mA	
HTFB1/MUA/400	400 mm	4 … 20 mA	

Optional	
Mounting flange Z-60	

Order example: High Temperature Sensor with 400 mm fitting length and 0-10 V output signal = HTFB1/MUV/400

Special models available on demand.

CONTACT TEMPERATURE SENSOR - ANTF1 / ANTF2 / MU

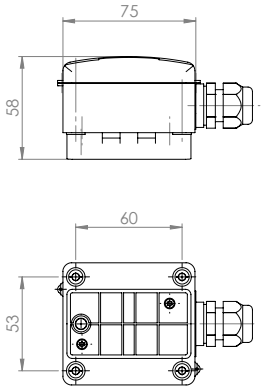
Application
For measuring the temperature on round surfaces such as pipes. There are two sensor types available. Both are equipped with an aluminum prism and delivered with a tension band, allowing for easy and fast mounting on round surfaces such as cold and hot water pipes. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

WPC

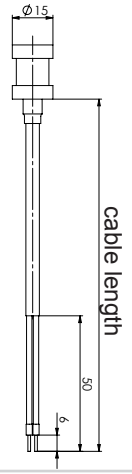
3 Years Warranty

Technical Data	ANTF1 / ANTF2
Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Technical Drawing ANTF1



Technical Drawing ANTF2



Temperature Sensor	ANTF1	ANTF2
Measuring range:	-50 °C ... +100 °C	-50 °C ... +105 °C
Temperature sensor:	Pt1000 Class B (2-wire)	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²	Screw clamps, max 1.5 mm²
Material contact element:	Brass	Aluminium
Tmax. (housing):	+100 °C	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm	75 x 69 x 44 mm
Protection class:	IP65	IP54
Mounting equipment (incl.):	Tension band	Tension band

Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output	Model	
ANTF1 / MUV	0 ... 10 V	Housing	
ANTF1 / MUA	4 ... 20 mA	Housing	
ANTF2 / MUV	0 ... 10 V	2 m PVC	
ANTF2 / MUA	4 ... 20 mA	2 m PVC	

Optional	
Display	
Relay	

Order example: Contact sensor with housing and 0-10 V output signal = ANTF1/MUV
Special models available on demand.

CONTACT TEMPERATURE SENSOR - ANTF3VA / ANTF3MS / MU

Application

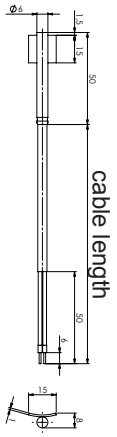
For measuring the temperature on round surfaces such as pipes. The sensors are available as stainless steel and brass versions. The rounded egde at the end of the sensor and the included tension band allow for easy mounting on pipes. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC. A tension band is included in the delivery.

WPC

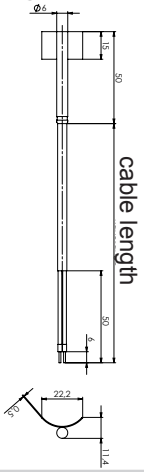
3 Years Warranty

Technical Data	ANTF3VA / ANTF3MS
Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Technical Drawing ANTF3VA



Technical Drawing ANTF3MS



Temperature Sensor	ANTF3VA	ANTF3MS
Measuring range:	-50 °C ... +200 °C	-50 °C ... +200 °C
Temperature sensor:	Pt1000 Class B (2-wire)	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²	Screw clamps, max 1.5 mm²
Material contact element:	stainless steel	Brass
Power supply cord:	2 m Silicone	2 m Silicone
Tmax. (housing):	+100 °C	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm	75 x 69 x 44 mm
Protection class:	IP54	IP54
Mounting equipment (incl.):	Tension band	Tension band

Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output	Model	
ANTF3VA / MUV	0 ... 10 V	Stainless steel	
ANTF3VA / MUA	4 ... 20 mA	Stainless steel	
ANTF3MS / MUV	0 ... 10 V	Brass	
ANTF3MS / MUA	4 ... 20 mA	Brass	

Optional	
Display	
Relay	

Order example: Contact sensor (brass) with 4-20 V output signal = ANTF3MS/MUA

Special models available on demand.

SURFACE TEMPERATURE SENSOR - OBTF / MU

Application

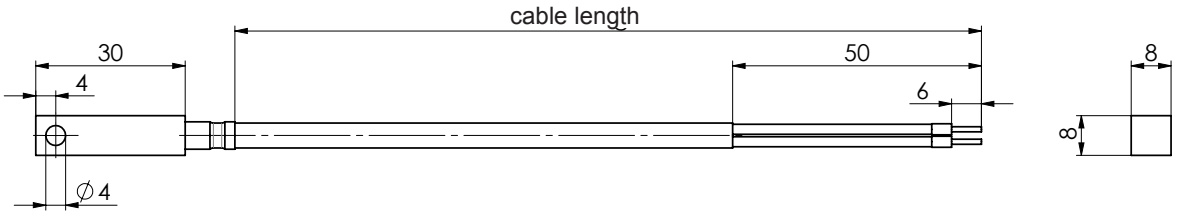
The Surface Temperature Sensor OBTF is designed for measuring the temperature on plain surfaces such as windows. The feeler is made of aluminum and can be mounted to the respective surface with the bore hole (4,1 mm) located on the upper half of the sensor. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C … +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	-35 °C … +105 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm^2
Protection sleeve:	8 x 8 x 40 mm, Aluminium
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP54

Technical Drawing OBTF



Further details regarding the measuring transducer available on page 74.

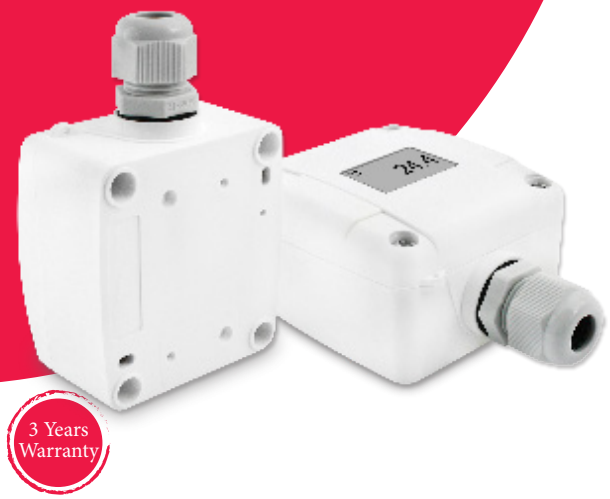
Overview (Product Group 1)

Type	Output	Cord length	
OBTF / MUV	0 … 10 V	2 m	
OBTF / MUA	4 … 20 mA	2 m	

Optional	
Display	
Power supply cord/meter PVC	
Relay	

Order example: Surface sensor with 0-10 V output signal = OBTF/MUV

Special models available on demand.



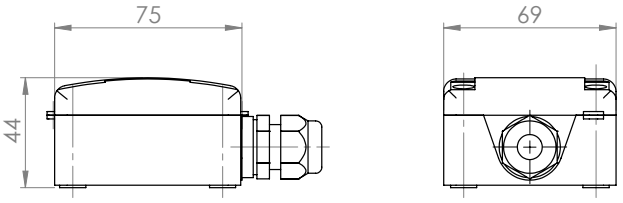
3 Years Warranty

OUTDOOR TEMPERATURE SENSOR - AUTF / MU

Application
Our AUTF is available with all conventional sensor types. Temperatures are recorded inside the sturdy and humidity-resistant plastic housing. The AUTF is mainly used in weather-dependend environments, such as outer walls, where direct insolation should be avoided. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data	
Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG
Temperature Sensor	
Measuring range:	-50 °C ... +100 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (incl.):	Screws and dowels

Technical Drawing AUTF



Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output	
AUTF / MUV	0 ... 10 V	
AUTF / MUA	4 ... 20 mA	

Optional	
Display	
Relay	

Order example: Outdoor sensor with 0-10 V output signal = AUTF/MUV
Special models available on demand.

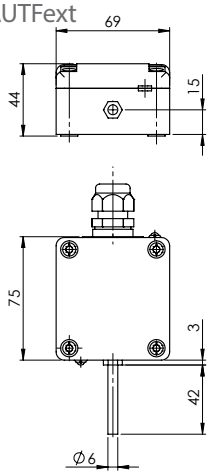
OUTDOOR TEMPERATURE SENSOR - AUTFEXT / AUTFEXTS / MU

Application

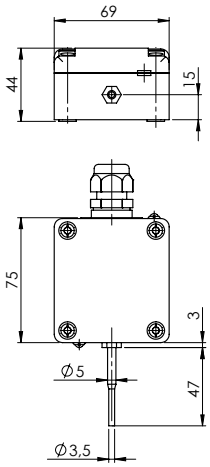
Our AUTFEXT/AUFTEXTS are available with all conventional sensor types. The temperature is measured inside the sensor tube. The AUFTFEXTS is equipped with a tapered sleeve for an ever faster response time. The sensors are mainly used in weather-dependend environments, such as outer walls, where direct insolation should be avoided. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data	AUTFext / AUTFextS
Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Technical Drawing AUTFext



Technical Drawing AUTFextS



Temperature Sensor	AUTFext	AUTFextS
Measuring range:	-50 °C ... +100 °C	-50 °C ... +100 °C
Temperature sensor:	Pt1000 Class B (2-wire)	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²	Screw clamps, max 1.5 mm²
Protection sleeve:	Stainless steel	Stainless steel
Diameter Protection sleeve:	6 mm	5mm, (head) tapered to 3,5mm
Length protection sleeve:	42 mm	47 mm
Tmax. (housing):	+100 °C	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm	75 x 69 x 44 mm
Protection class:	IP65	IP65
Mounting equipment (incl):	Screws and dowels	Screws and dowels

Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output	Sleeve	
AUTFext / MUV	0 ... 10 V	straight	
AUTFext / MUA	4 ... 20 mA	straight	
AUTFextS / MUV	0 ... 10 V	tapered	
AUTFextS / MUA	4 ... 20 mA	tapered	

Optional	
Display	
Relay	

Order example: Outdoor sensor with external sleeve and 0-10 V output signal = AUTFext/MUV

Special models available on demand.

OUTDOOR TEMPERATURE SENSOR WITH SUN PROTECTION - AUTFEXT2 / MU

Application

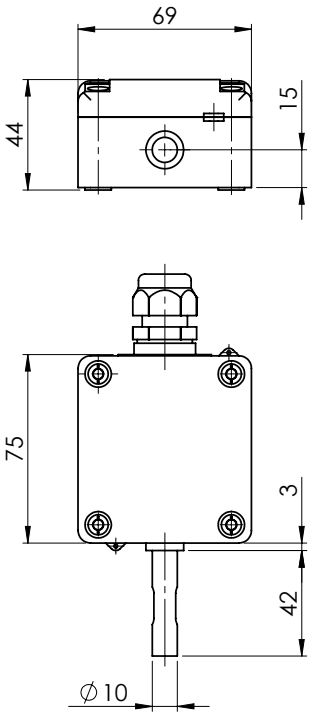
The AUTFEXT2 is used for temperature Measurements in outdoor areas. Radiant heat is diverted via the integrated feeler tube, protecting the device from insolation and thus allowing for a more accurate measurement. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	-50 °C ... +100 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Sun protection:	10 x 42 mm
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting equipment (incl.):	Screws and dowels

Technical Drawing AUTFext2



Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output	
AUTFext2 / MUV	0 ... 10 V	
AUTFext2 / MUA	4 ... 20 mA	

Optional	
Display	
Relay	

Order example: Outdoor sensor with external sleeve, sun protection and 4-20 mA output signal = AUTFext2/MUA

Special models available on demand.

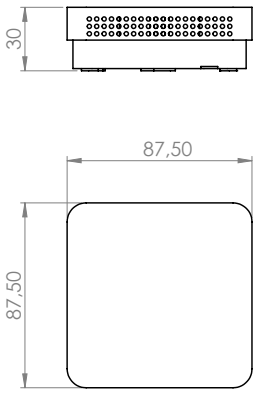
INDOOR TEMPERATURE SENSOR (SURFACE-MOUNTED) - RTF3 / RTFVA / MU

Application

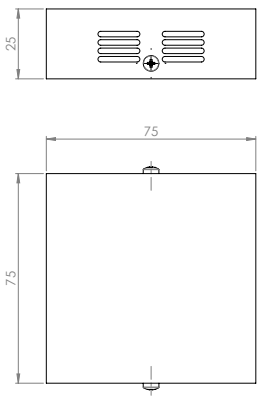
For measuring the temperature in living and office spaces, reception halls, foyers etc. The modern and plain design allows for easy and inconspicuous mounting. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data	RTF3 / RTFVA
Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Technical Drawing RTF3



Technical Drawing RTFVA



Temperature Sensor	RTF3	RTFVA
Measuring range:	-35 °C ... +70 °C	-35 °C ... +70 °C
Temperature sensor:	Pt1000 Class B (2-wire)	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²	Screw clamps, max 1.5 mm²
Tmax. (housing):	+100 °C	+100 °C
Housing:	ABS in RAL 9010	Stainless steel 1.4571
Measurements Housing:	87,5 x 87,5 x 30 mm	75 x 75 x 25 mm
Protection class:	IP20	IP20
Mounting equipment (optional):	Screws and dowels	Screws and dowels

Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output	Housing	
RTF3 / MUV	0 ... 10 V	Plastic	
RTF3 / MUA	4 ... 20 mA	Plastic	
RTFVA / MUV	0 ... 10 V	stainless steel	
RTFVA / MUA	4 ... 20 mA	stainless steel	

Optional	
Display (RTF3 only)	
Poti passive(RTF3 only)	
Poti active (RTF3 only)	
Relay (RTF3 only)	

Order example: Indoor sensor with plastic housing and 0-10 V output signal = RTF3/MUV

Special models available on demand.

3 Years Warranty

RADIATION SENSOR - STF / MU

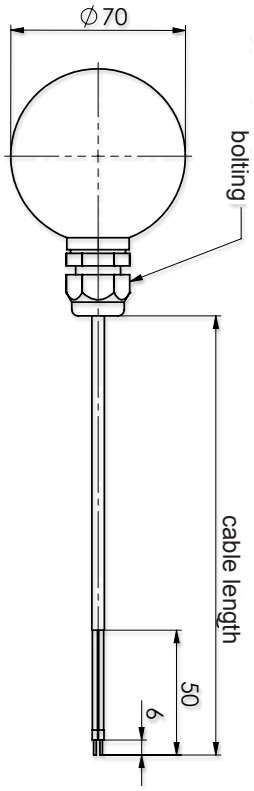
Aktiv mit 0 … 10 V or 4 … 20 mA Output

Application

For indoor temperature measuring applications. The sensor is suspended from above, making it especially suitable for temperature Measurements in large rooms and halls with a high ceiling. The Radiation sensor is used to record an accurate measurement of the perceived temperature. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data	
Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C … +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG
Temperature Sensor	
Measuring range:	-30 °C … +70 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Kugel:	Diameter: 70 mm
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP30

Technical Drawing STF



Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output	Cord length		Optional	
STF / MUV / 1.5	0 … 10 V	1,5 m		Display	
STF / MUV / 3.0	0 … 10 V	3,0 m		Relay	
STF / MUV / 5.0	0 … 10 V	5,0 m			
STF / MUV / 10.0	0 … 10 V	10,0 m			
STF / MUA / 1.5	4 … 20 mA	1,5 m			
STF / MUA / 3.0	4 … 20 mA	3,0 m			
STF / MUA / 5.0	4 … 20 mA	5,0 m			
STF / MUA / 10.0	4 … 20 mA	10,0 m			

Order example: Radiation sensor with 10 meter cord and 4-20 mA output signal = STF/MUA/10.0

Special models available on demand.

RADIATION SENSOR - INDOOR - RSTF / MU

3 Years Warranty

Application

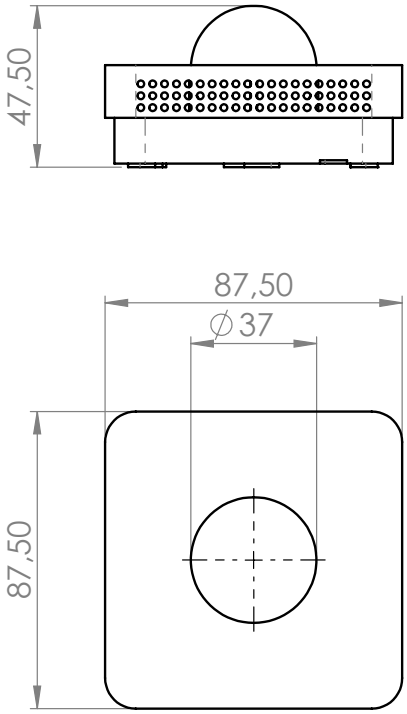
For measuring the temperature in living and office spaces, reception halls, foyers etc. The modern and plain design allows for easy and inconspicuous mounting. The Radiation sensor is used to record an accurate measurement of the perceived temperature. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	-35 °C ... +70 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Tmax. (housing):	+100 °C
Housing:	ABS in RAL 9010
Measurements Housing:	87,5 x 87,5 x 47,5 mm
Protection class:	IP30
Sphere:	Diameter 37 mm

Technical Drawing RSTF / MU



Further details regarding the measuring transducer available on page 74.

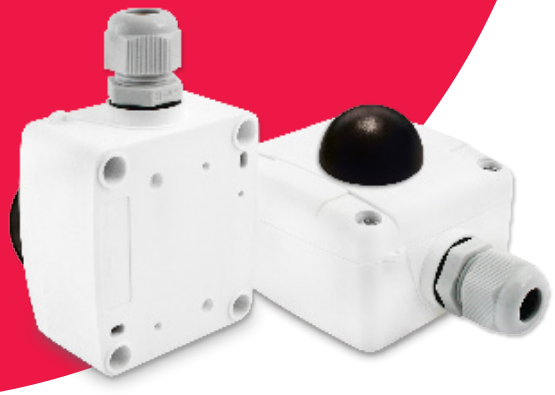
Overview (Product Group 1)

Type	Output	
RSTF / MUV	0 ... 10 V	
RSTF / MUA	4 ... 20 mA	

Optional	
Relay	

Order example: Radiation sensor with Pt1000 sensor = RSTF/MUV

Special models available on demand.



RADIATION SENSOR - OUTDOOR - ASTF / MU

Application

For outdoor temperature measuring applications. The Radiation sensor is used to record an accurate measurement of the perceived temperature. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

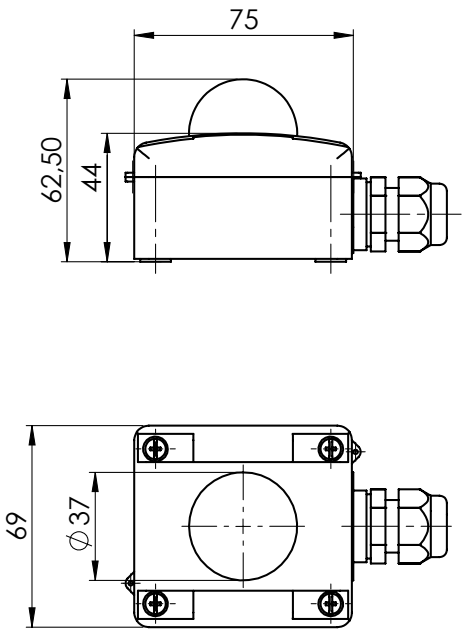
3 Years Warranty

Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	-50 °C ... +100 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Kugel:	Diameter: 37 mm
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65
Mounting material (incl.):	Screws and dowels

Technical Drawing ASTF / MU



Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output	
ASTF / MUV	0 ... 10 V	
ASTF / MUA	4 ... 20 mA	
Optional		
Relay		

Order example: Radiation sensor with Ni1000 sensor = ASTF/MUV

Special models available on demand.

SCREW-IN SENSOR - ESF / MU

Application

Our ESF Screw-in Sensor has a G1/2" thread and can be applied in gaseous and liquid media with pressures up to m40 bar. For heating, ventilation and air conditioning applications. The ESF is used in heating, ventilation, refrigeration and air conditioning applications. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

WPC

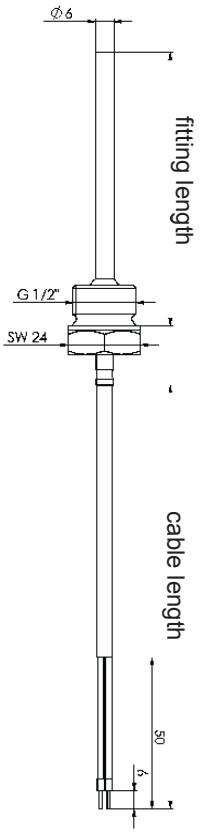
3 Years Warranty

Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C … +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	See table
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Cord length:	2.0 meters (Standard)
Connection thread:	G1/2", SW27
Material:	VA
Pressure resistance:	40 bar
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP54

Technical Drawing ESF



Overview (Product Group 1)

Type	Fitting length	Output	Leitung	
ESF / MUV / 50 / P	50 mm	0 … 10 V	PVC up to 105 °C	
ESF / MUV / 100 / P	100 mm	0 … 10 V	PVC up to 105 °C	
ESF / MUV / 50 / S	50 mm	0 … 10 V	Silicone bis 200 °C	
ESF / MUV / 100 / S	100 mm	0 … 10 V	Silicone bis 200 °C	
ESF / MUV / 50 / G	50 mm	0 … 10 V	Glass fibre up to 400 °C	
ESF / MUV / 100 / G	100 mm	0 … 10 V	Glass fibre up to 400 °C	
ESF / MUA / 50 / P	50 mm	4 … 20 mA	PVC up to 105 °C	
ESF / MUA / 100 / P	100 mm	4 … 20 mA	PVC up to 105 °C	
ESF / MUA / 50 / S	50 mm	4 … 20 mA	Silicone bis 200 °C	
ESF / MUA / 100 / S	100 mm	4 … 20 mA	Silicone bis 200 °C	
ESF / MUA / 50 / G	50 mm	4 … 20 mA	Glass fibre up to 400 °C	
ESF / MUA / 100 / G	100 mm	4 … 20 mA	Glass fibre up to 400 °C	

Optional	
Display	
Relay	

Further details regarding the measuring transducer available on page 74.

Order example: Screw-In Temperature Sensor 50 mm with silicone cable and 4-20 mA output signal = ESF/MUA/50/S

Special models available on demand.

SCREW-IN/IMMERSION TEMPERATURE SENSOR - ENTF / MU

Application

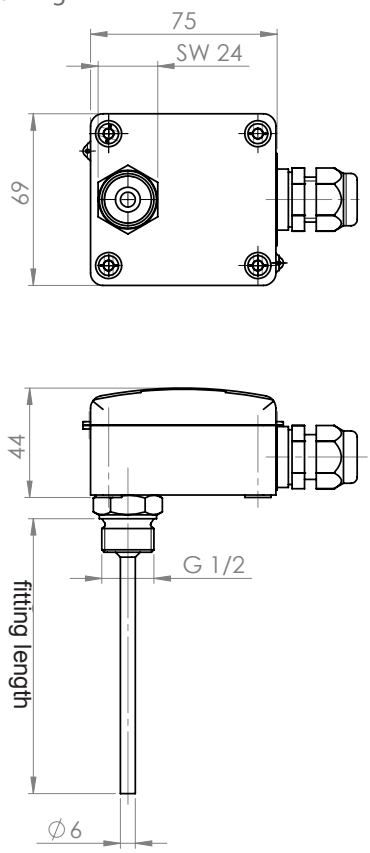
For measuring the temperature of liquid/aggressive and gaseous media. The ENTF is used in heating, ventilation, refrigeration and air conditioning applications. The sensor is easily mounted to the container or duct to be measured with the help of the G 1/2" terminal thread. With the help of the respective sensors (see below) , the device can be connected to all conventional control and display systems. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C ... +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range (head):	-50 °C ... +180 °C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Protection sleeve:	Ø6 mm stainless steel
Connection Thread:	G1/2" SW24
Fitting lengthn:	50 / 100 / 150 / 200 / 300 / 400 mm
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP65

Technical Drawing ENTF



Overview (Product Group 1)

Type	Fitting length	Output	
ENTF / MUV / 50	50 mm	0 ... 10 V	
ENTF / MUV /100	100 mm	0 ... 10 V	
ENTF / MUV / 150	150 mm	0 ... 10 V	
ENTF / MUV / 200	200 mm	0 ... 10 V	
ENTF / MUV / 300	300 mm	0 ... 10 V	
ENTF / MUV / 400	400 mm	0 ... 10 V	
ENTF / MUA / 50	50 mm	4 ... 20 mA	
ENTF / MUA / 100	100 mm	4 ... 20 mA	
ENTF / MUA / 150	150 mm	4 ... 20 mA	
ENTF / MUA / 200	200 mm	4 ... 20 mA	
ENTF / MUA / 300	300 mm	4 ... 20 mA	
ENTF / MUA / 400	400 mm	4 ... 20 mA	

Optional	
Display	
Relay	

Further details regarding the measuring transducer available on page 74.

Order example: Screw-In Temperature Sensor 200 mm with silicone cable and 4-20 mA output signal = ENTF/MUA/200

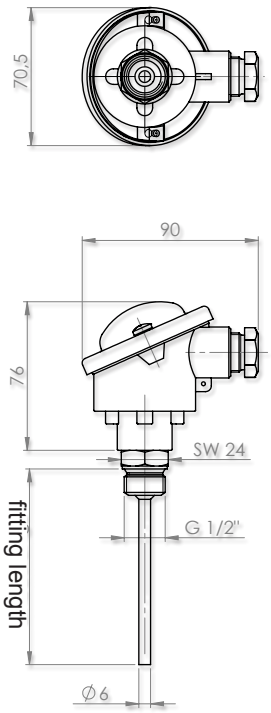
Special models available on demand.

SCREW-IN SENSOR - HTFB2 / MU

Application
Our HTBF2 is a screw-in sensor with B shape connecting head and a measuring range of -50°C...+180°C with a maximum pressure of 40 bar. The sensors are equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data	
Power supply (0 … 10 V):	15 … 35 V DC /15 … 26 V AC
Power supply (4 … 20 mA):	10 … 30 V DC
Adjustment range (0 … 10 V) settable via jumper:	-100 °C … +600 °C 12 presetted Measuring ranges
Adjustment range (4 … 20 mA) programmable:	-200 °C … +850 °C
Accuracy (0 … 10 V):	0,3% full scale
Accuracy (4 … 20 mA):	0,3% full scale
Sensor:	Pt100 , Class B acc. DIN 60751
Connection (0 … 10 V):	3-wire
Connection (4 … 20 mA):	2-wire
Housing:	Connective head, B shape, aluminum
Cable inlet:	Screw connection M20 x 1,5
Material Protection sleeve:	Stainless steel
Connection Thread:	G1/2"SW24
Diameter Protection sleeve:	6 mm
Protection class:	IP54
Operating temperature sensor:	-40 °C … +180 °C
Electronics/Head operating temperature:	-40 °C … +85 °C
Mounting equipment (optional):	Immersion sleeve THVA3

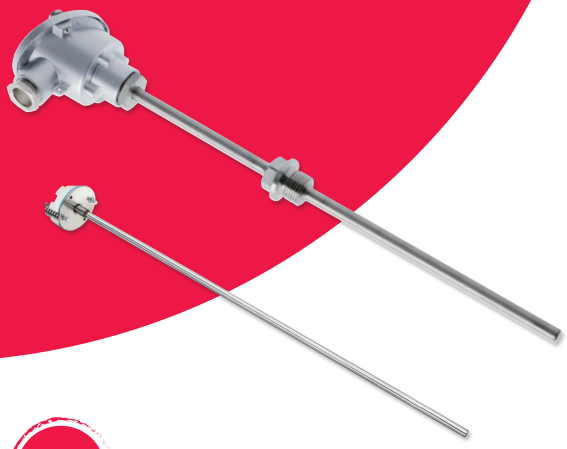
Technical Drawing HTFB2



Overview (Product Group 1)

Type	Fitting length	Output	
HTFB2 / MUV / 100	100 mm	0 … 10 V	
HTFB2 / MUV / 200	200 mm	0 … 10 V	
HTFB2 / MUV / 300	300 mm	0 … 10 V	
HTFB2 / MUV / 400	400 mm	0 … 10 V	
HTFB2 / MUA / 100	100 mm	4 … 20 mA	
HTFB2 / MUA / 200	200 mm	4 … 20 mA	
HTFB2 / MUA / 300	300 mm	4 … 20 mA	
HTFB2 / MUA / 400	400 mm	4 … 20 mA	

Order example: Screw-In Temperature Sensor 100 mm and 4-20 mA output signal = HTFB2/MUA/100
Special models available on demand.



3 Years Warranty

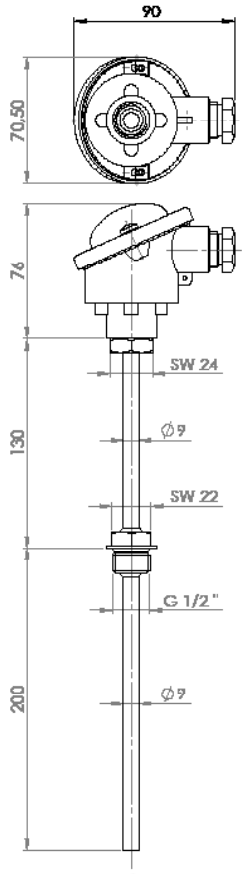
SCREW-IN SENSOR WITH NECK TUBE - HTFB3 / MU

Application

Our HTFB3 features an interchangable measuring unit and has an application temperature of -50°C ... +600°C. The sensor is used to record an accurate measurement of the perceived temperature. The HTFB3 is directly connected to the pipe to be measured with the help of a stainless steel sleeve and a G1/2" thread. The neckpipe allows for a better heat dissipation. The sensor is equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

Technical Data	
Power supply (0 … 10 V):	15 … 35 VDC / 15 … 26 VAC
Power supply (4 … 20 mA):	10 … 30 VDC
Adjustment range (0 … 10 V) settable via jumper:	-100 °C … +600 °C 12 presetted Measuring ranges
Adjustment range (4 … 20 mA) programmable:	-200 °C … +850 °C
Accuracy (0 … 10 V):	0,3% full scale
Accuracy (4 … 20 mA):	0,3% full scale
Sensor:	Pt100 , Class B acc. DIN60751
Connection (0 … 10 V):	3-wire
Connection (4 … 20 mA):	2-wire
Housing:	Connective head, B shape, aluminum
Cable inlet:	Screw connection M20 x 1,5
Material Protection sleeve:	Stainless steel
Connection Thread:	G1/2"
Length Neck tube:	130 mm
Diameter Protection sleeve:	9 mm
Protection class:	IP54
Operating temperature sensor:	-40 °C … +600 °C
Electronics/Head operating temperature:	-40 °C … +85 °C

Technical Drawing HTFB3



Overview (Product Group 1)

Type	Fitting length	Output	
HTFB3 / MUV / 100	100 mm	0 … 10 V	
HTFB3 / MUV / 250	250 mm	0 … 10 V	
HTFB3 / MUV / 400	400 mm	0 … 10 V	
HTFB3 / MUA / 100	100 mm	4 … 20 mA	
HTFB3 / MUA / 250	250 mm	4 … 20 mA	
HTFB3 / MUA / 400	400 mm	4 … 20 mA	

Order example: Screw-In Temperature Sensor 250 mm with neck tube and 4-20 mA output signal = HTFB3/MUA/250

Special models available on demand.

CEILING-MOUNTED TEMPERATURE SENSOR - DEBF / MU

Application

For indoor temperature measuring applications (to be flush-mounted). The sensor features a plain and modern design and is mounted to the ceiling with the help of two tension springs. The DEBF is equipped with a standardized 0...10 V or 4...20mA output and can be connected to any PLC or DDC.

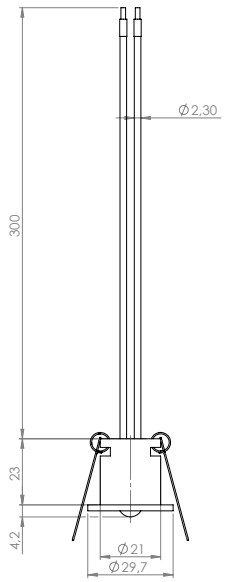
3 Years Warranty

Technical Data

Measuring transducer	
Required temperature sensor:	Pt1000 Class B (2-wire)
Power supply (4...20 mA):	12-34 V AC/VDC
Power supply (0...10 V):	12-34 V AC/VDC
Analogue output burden (4...20 mA):	50...500 Ohms
Load at analogue output (0...10 V):	10 ... 100 kOhms
Power input (0...10 V):	20 mA
Power input (4...20 mA):	24-44 mA
Accuracy:	+/- 0,2 K + max. 3% full scale
Measuring range:	24 Measuring ranges available
Operating temperature:	-30 °C … +70 °C
Connection:	3-wire (4...20 m - optional 2-wire)
Norms:	CE, Electromagnetic Compatibility acc. EN 61326-1 2013, EG Act 2004/108/EG

Temperature Sensor	
Measuring range:	-20°C ... +90°C
Temperature sensor:	Pt1000 Class B (2-wire)
Connection:	Screw clamps, max 1.5 mm²
Material Mounting Head:	Ceramic
Cord length:	2.0 meters (Standard)
Tmax. (housing):	+100 °C
Housing:	PA6 15% GK, Colour RAL 9010
Measurements Housing:	75 x 69 x 44 mm
Protection class:	IP20

Technical Drawing DEBF



Further details regarding the measuring transducer available on page 74.

Overview (Product Group 1)

Type	Output		Optional	
DEBF / MUV	0 … 10 V		Display	
DEBF / MUA	4 … 20 mA		Relay	

Order example: Ceiling-mounted Sensor with 4-20 mA output signal = DEBF/MUA

Special models available on demand.

HUMIDITY

HUMIDITY SENSOR – CONDENSATION MONITOR - LEAK SENSOR - RAIN SENSOR

The physical term "humidity" signifies the water content. Gaseous humidity in general is termed as "Air humidity". In the context of liquid water, we are talking about "mist", "fog" or "vapor".
The "absolute humidity" specifies how much vapor is contained in the gas mixture's volume unit. Here the following measuring unit is used: g (water) x m-3.

"Relative humidity" is the ratio of water vapor contained in the gas at a certain temperature and the possible satiation level, multiplied by 100. "Relative humidity" is expressed as percentage.

TiTEC's humidity measuring solutions feature digital sensors and a large measuring range. At the customer's option, our devices are able to display relative humidity, absolute humidity and the dew point.

HUMIDITY

COMBINED HUMIDITY AND TEMPERATURE SENSOR

The humidity measurement solutions from Titec have both a digital sensors and a large measuring range. In order to fit your exact requirements - relative humidity, absolute humidity and dew point, mixing ratio, enthalpy, and pre-programmed temperature ranges can be choosen

.

The absolute humidity indicates how much water vapor is contained in the unit volume of the gas mixture. The unit is: g (water) x m^3.

When the relative humidity is the multiplied by a factor of 100 quotient of existing at a given temperature in the gas quantity of steam and the corresponding possible saturation amount.

Indicated is the relative humidity in percent.

The mixing ratio of gaseous water to dry air per unit volume can be calculated from the sensor.

The calculated value is expressed in g / kg. The enthalpy is the energy content of the air flowing around the sensor.

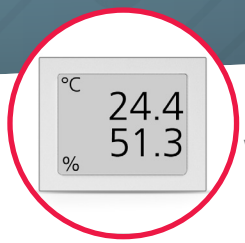
The more dense, humid and / or warmer the air flowing around, the more energy is this.

The enthalpy is calculated from temperature and absolute moisture content and kg given in kJ /.

In order to meet the wide range of requirements of our proven sensor technology, while ensuring a high level of functionality and ease of use, we have revised the portfolio room units.

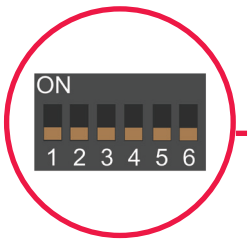
The sensor system was easily sold to increase the measurement accuracy, in addition there is the option of a relay output and potentiometer in passive and active design.

PLAIN, BUT STILL A KIND OF UNIQUE
EASY MOUNTABLE // STURDY // SAFE



Displayversion
with E-Paper available

0,5K
2% (20%...80%)



Adjustable via DIP-Switch
- 4 Measuring ranges
- Relative Humidity
- Absolute Humidity
- Dew point
- MIxing ration
- Enthalpy

Additional passive sensor
element available

0-10V
or
4-20mA

INDOOR COMBINATION SENSOR FOR RELATIVE HUMIDITY AND TEMPERATURE - RFFT/R-X/S

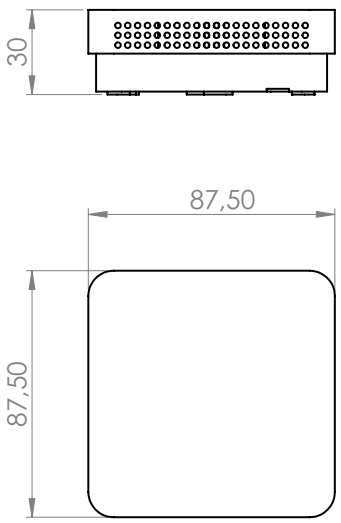
Application

Apparatus for measuring the relative humidity and/or temperature in living and office spaces, reception halls, foyers etc. The measuring transducer records the temperature and humidity via an internal sensorand coverts the value into a standardized analogue output signal in the range between 0-10V/4-20 mA.

3 Years Warranty

Technical Data	
Power supply	12 … 34 VAC/VDC
Sensor element humidity:	capacitive sensor
Sensor element temperature:	capacitive sensor
Sensor element temperature passive (opt.)	at customer's option
Measuring range humidity:	0 … 100% r.h.
Output humidity:	0 … 10 V or 4 … 20 mA
Tolerance Humidity 35% … 70% r.h.:	± 2% (25 … 90% r.h.)
Measuring ranges temperature:	See table
Active output signal temperature	0 … 10 V or 4 … 20 mA
Tolerance temperature:	± 0,5 K
Load at analogue output (0...10 V):	10 ... 100 kOhms
Analogue output burden (4 … 20 mA):	300 … 1000 Ohms
Operating temperature:	-30 °C … +50 °C
Operating range:	0 … 98% r.h.
Response time (r.h.):	8 Sec. (at 63% condensation)
Connection:	Screw clamps max. 1.5 mm
Housing:	Material ABS, Colour RAL 9010
Measurements housing:	87,5 x 87,5 x 30 mm
Protection class:	IP30

Technical Drawing RFFT/R-x/S



Overview (Product Group 1)

Type	Output Temp.	Output humidity	Display	
RFFT/R-U/S	0 … 10 V	0 … 10 V		
RFFT/R-I/S	4 … 20 mA	4 … 20 mA		
RFFT/R-xxx/S	passive	0 … 10 V		
RFFT/R-U/S-D	0 … 10 V	0 … 10 V	incl.	
RFFT/R-I/S-D	4 … 20 mA	4 … 20 mA	incl.	
RFFT/R-xxx/S-D	passive	0 … 10 V	incl.	

Optional	
Passive pot	
Active poti	
Relay	

Order example: Indoor Combination Sensor for relative temperature/humidity with 0-10 V output signal = RFFT/R-U/S

Special models available on demand.

OUTDOOR COMBINATION SENSOR FOR RELATIVE HUMIDITY/ TEMPERATURE - ARFT/R-X/S

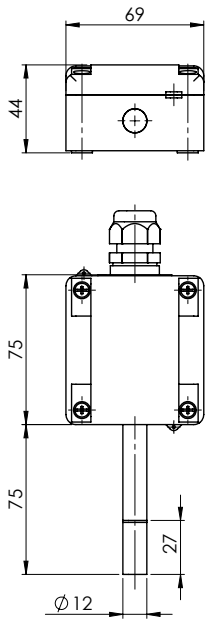
3 Years Warranty

Application

Device for measuring the relative humidity/temperature in outdoor areas or indoor areas subject to high requirements. The measuring transducer records the temperature and humidity via an internal sensor and coverts the value into a standardized analogue output signal in the range between 0-10V/4-20 mA. Additionally, a passive temperature sensor can be connected. The sensor features long-term stability and no recalibration is required.

Technical Data	
Power supply:	12 … 34 VAC/VDC
Sensor element humidity:	capacitive sensor
Sensor element temperature:	capacitive sensor
Sensor element temperature passive (opt.):	at customer's option
Measuring range humidity:	0 … 100% r.h.
Output humidity:	0 … 10 V or 4 … 20 mA
Tolerance humidity 35% … 70% r.h.:	± 2% (25 … 90% r.h.)
Measuring range temperature:	-30 °C … +70 °C
Active output signal temperature	0 … 10 V or 4 … 20 mA
Tolerance temperature:	± 0,5 K
Load at analogue output (0...10 V):	10 ... 100 kOhms
Analogue output burden (4 … 20 mA):	300 … 1000 Ohms
Operating temperature:	-30 °C … +70 °C
Operating range:	0 … 98% r.h.
Response time (r.h.):	8 Sec. (at 63% condensation)
Protection sleeve:	12 x 75 mm stainless steel
Connection:	Screw clamps max. 1.5 mm
Housing:	PA6 15% GK, Colour RAL 9010
Measurements housing:	75 x 69 x 44 mm
Protection class:	IP65
Sensor protection:	Sintered filter, HD polyethylene

Technical Drawing ARTF/R-x/S



Overview (Product Group 1)

Type	Output temp.	Output humidity	Display	
ARFT/R-U/S	0 … 10 V	0 … 10 V		
ARFT/R-I/S	4 … 20 mA	4 … 20 mA		
ARFTP/R-xxx/S	passive sensor	0 … 10 V		
ARFT/R-U/S-D	0 … 10 V	0 … 10 V	incl.	
ARFT/R-I/S-D	4 … 20 mA	4 … 20 mA	incl.	
ARFTP/R-xxx/S-D	passive sensor	4 … 20 mA	incl.	

Accessories

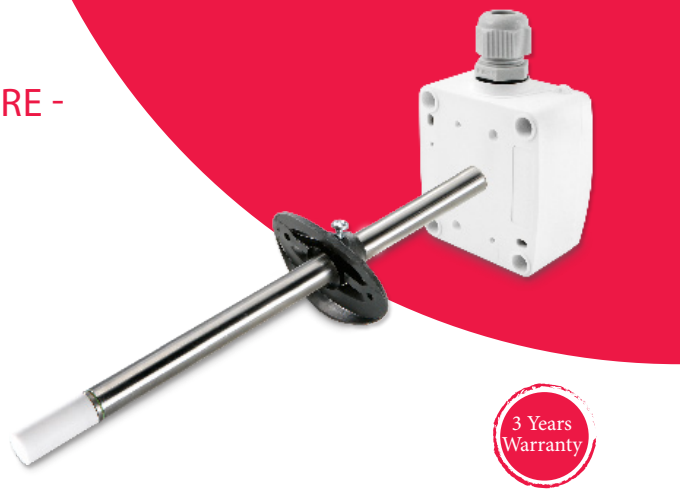
Plastic filter for faster response time	
Measurements:	12x27 mm

Optional	
Relay	

Order example: Outdoor Combination Sensor for Relative Temperature/Humidity with 0-10 V output signal = ARFT/R-U/S

Special models available on demand.

DUCT COMBINATION SENSOR FOR RELATIVE HUMIDITY AND TEMPERATURE - KFFT/R-X/S



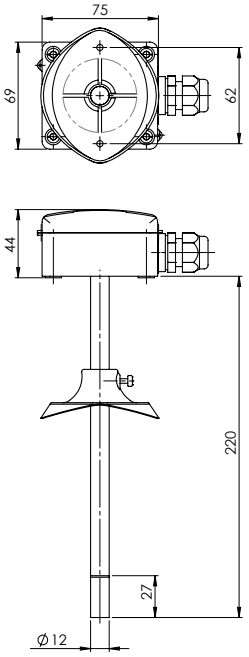
3 Years Warranty

Application

Device for measuring the relative humidity/temperature in ducts or indoor areas subject to high requirements. The measuring transducer records the temperature and humidity via an internal sensor and converts the value into a standardized analogue output signal in the range between 0-10V/4-20 mA.

Technical Data	
Power supply:	12 … 34 VAC/VDC
Sensor element humidity:	capacitive sensor
Sensor element temperature:	capacitive sensor
Sensor element temperature passive (opt.):	at customer's option
Measuring range humidity:	0 … 100% r.h.
Output humidity:	0 … 10 V or 4 … 20 mA
Tolerance humidity 35% … 70% r.h.:	± 2% (25 … 90% r.h.)
Measuring range temperature:	-30 °C … +70 °C
Active output signal temperature	0 … 10 V or 4 … 20 mA
Tolerance temperature:	± 0,5 K
Load at analogue output (0...10 V):	10 ... 100 kOhms
Analogue output burden 4 … 20 mA:	300 … 1000 Ohms
Operating temperature:	-30 °C … +70 °C
Operating range:	0 … 98% r.h.
Response time (r.h.):	8 Sec. (at 63% condensation)
Protection sleeve:	12 x 75 mm stainless steel
Connection:	Screw clamps max. 1.5 mm
Housing:	PA6 15% GK, Colour RAL 9010
Measurements housing:	75 x 69 x 44 mm
Protection class:	IP65
Sensor protection:	Sintered filter, HD polyethylene

Technical Drawing KFFT/R-x/S



Overview (Product Group 1)

Type	Output Temp.	Output humidity	Display	
KFFT/R-U/S	0 … 10 V	0 … 10 V	-	
KFFT/R-I/S	4 … 20 mA	4 … 20 mA	-	
KFFT/R-xxx/S	passive sensor	0 … 10 V	-	
KFFT/R-U/S-D	0 … 10 V	0 … 10 V	incl.	
KFFT/R-I/S-D	4 … 20 mA	4 … 20 mA	incl.	
KFFT/R-xxx/S-D	passive sensor	0 … 10 V	incl.	

Accessories

Plastic filter for faster response time	
Measurements:	12x27 mm

Optional	
Relay	

Order example: Duct Combination Sensor for Relative Temperature/Humidity with 0-10 V output signal = KFFT/R-U/S

Special models available on demand.

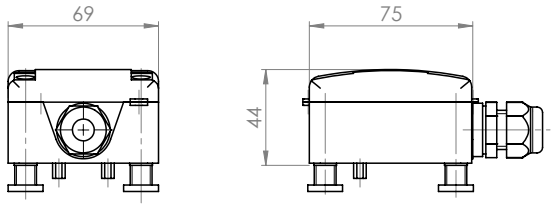
3 Years Warranty

LEAK SENSOR - LGM

Application
Our LGM reliably detects conductive liquids which is making it ideal for monitoring leakage and moisture content. The Main applications are in the building and climate technology. Using integrated switching output can be used to activate or disable actuators. There is the option to connect an acoustic / optical signal transmitter. The sensitivity is adjusted via a potentiometer, while switching polarity and optional alarm output can be configured via a DIP switch.

Technical Data	
Power supply:	12 … .34 VAC/VDC
Measuring principle:	Electrolytic AC voltage measurement
Switching point:	Adjustable via potentiometer
Operating current:	50mA
Relay contact:	Potential free (changeover) 60 V / DC 1A
Relay contact:	NO & NC adjustable via DIP switch
Housing:	PA6 15% GK, Colour RAL 9010
Measurements housing:	75 x 69 x 44 mm
Protection class:	IP65

Technical Drawing LGM



Overview (Product Group 1)

Type	
LGM	

Special models available on demand.

STEVENSON SCREEN - WHT

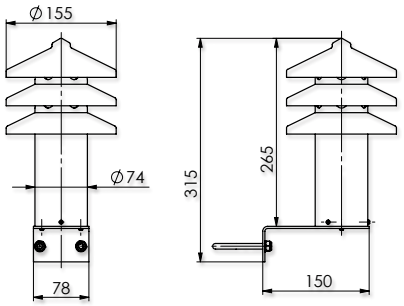
NEW!

Application

There exist various fields of application of our weather shelter in home and building automation. They're used to regulate actuators depend on the temperature and the measured moisture. The standardized output signals of 0-10V or 4-20mA make it easy to connect it with an existing control unit. The sensor provides an analog output signal, which is linear to moisture and temperature.

Technical Data	
Power supply (0...10 V):	12 … 34 VAC/VDC
Power supply (4 … 20 mA):	12 … 34 VAC/VDC
Sensor element humidity:	capacitive sensor
Sensor element temperature:	capacitive sensor
Measuring range humidity:	0 … 100% r.h.
Output humidity:	0 … 10 V or 4 … 20 mA
Tolerance humidity 35% … 70% r.h.:	± 2% (25 … 90% r.h.)
Measuring range temperature:	-30 °C … +70 °C
Output temperatur:	0 … 10 V or 4 … 20 mA
Tolerance temperature:	± 0,5 K
Load at analogue output (0...10 V):	10 ... 100 kOhms
Analogue output burden (4 … 20 mA):	300 … 1000 Ohms
Operating temperature:	-30 °C … +70 °C
Operating range:	0 … 98% r.h.
Response time (r.h.):	8 Sec. (at 63% condensation)
Connection:	Screw clamps max. 1.5 mm
Housing:	grey
Measurements housing:	265 x 155mm
Protection class:	IP65

Technical Drawing



Overview (Product Group 1)

Type	Output temp.	Output humidity	
WHT/U	0 … 10 V	0 … 10 V	
WHT/I	4 … 20 mA	4 … 20 mA	
WHT/U-230V	0 … 10 V	0 … 10 V	
WHT/I-230V	4 … 20 mA	4 … 20 mA	

Order example: Stevenson Screen with 0...10 V Output signal = WHT/U

Special models available on demand.

3 Years Warranty

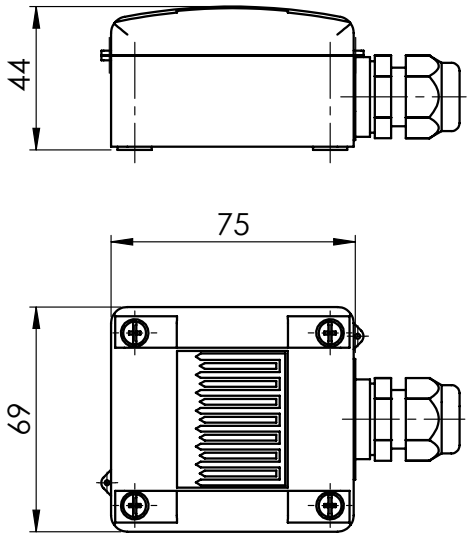
RAIN SENSOR - RGM

Application

The measuring procedure via electrolytic AC voltage allows the Rain-Sensor RGM to detect various kinds of precipitation e.g. rain or snow. Thanks to the installed passive potentiometer the circuit sensitivity can be adjusted optimally to the required field of application. The integrated heating accelerates the drying phase of the device and avoids the freezing of contact surfaces.

Technical Data	
Power supply:	24 VDC / VAC + 10%
Power consumption:	20 mA, heating ca. 80-90 mA
Measuring principle:	electrolytic AC voltage measurement
Contact load:	max. 30 VDC / 4A
Connection:	0,5 mm – 1,5 mm², Screw-In terminals with wire protection
Housing:	75x 69 x 44 mm
Cable inlet:	M16
Protection class:	IP65

Technical Drawing RGM



Overview (Product Group 1)

Typ	Description	
RGM	Rain sensor	
Z-229	Wall bracket	

Special models available on demand.

DEW POINT MONITOR -TPW / TPWext

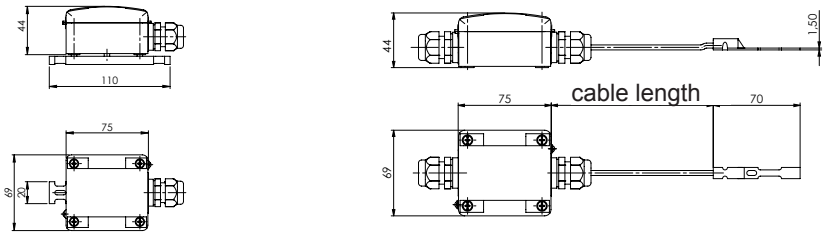
3 Years Warranty

Application

The Dew Point Monitor measures the relative humidity on pipes, cooling ceilings or other surfaces and transfers the value as a linear analogue 4...20 mA output signal. The device also features a changeover contact for which the limiting value can be adjusted between 75 and 100 % r.h. with the help of a potentiometer. This way the respective signal can be transferred to the control/DDC when condensation is forming in order to activate the respective actuators.

Technical Data	
Power supply:	20 … 34 VAC/VDC
Power input (0 … 10 V):	20 mA
Power input (4 … 20 mA):	24 ... 44 mA
Electrical connection:	Screw clamps 1.5 mm²
Sensor:	digital combination sensor for humidity and temperature
Measuring range for continuous output	0 … 100% r.h.
Measuring range for switching output (adjustable):	85 … 95% r. h.
Load at analogue output (0...10 V):	10 ... 100 kOhms
Analogue output burden (4 … 20 mA):	300 … 1000 Ohms
Switching output:	Potential free (changeover) 60 V / DC 1A
Housing:	PA6 15% GK, Colour RAL 9010
Length supply cord:	2.0 meters Silicone up to 180 °C
Measurements housing:	75 x 69 x 44 mm
Cable inlet:	M16x1.5
Protection class:	IP65
Admissible ambient temperature:	-30 °C … +70 °C
Admissible ambient humidity:	Max. 95% non-condensing
Optional:	E-Paper Display 1,44“ visible surface: 29 x 22 mm Resolution: 128 x 96 Pixel

Technical Drawing TPW / TPWext



Overview (Product Group 1)

Typ	Output	Display	
TPW / U	0 … 10 V	-	
TPW / I	4 … 20 mA	-	
TPW / U-D	0 … 10 V	incl.	
TPW / I-D	4 … 20 mA	incl.	
TPWext / U	0 … 10 V	-	
TPWext / I	4 … 20 mA	-	
TPWext / U-D	0 … 10 V	incl.	
TPWext / I-D	4 … 20 mA	incl.	

BOrder example: Dew point monitor with external sensor and 4-20 mA output signal = TPWext-I

Special models available on demand.

3 Years Warranty

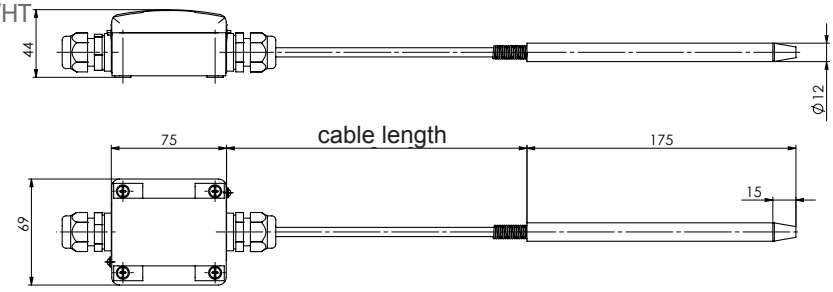
HIGH-TEMPERATURE- / HUMIDITY SENSOR - ARFT/R-X/HT

Application

Device for measuring the relative humidity/temperature in outdoor areas or indoor areas subject to high requirements. The measuring transducer measures the temperature and humidity via an internal sensor and coverts the value into a standardized analogue output signal in the range between 0-10V/4-20 mA. Additionally, a passive temperature sensor can be connected. Various measuring ranges are available depending on the model. The sensor features long-term stability and no recalibration isrequired.

Technical Data	
Power supply:	12 … 34 VAC/VDC
Sensor element humidity:	capacitive sensor
Sensor element temperature:	capacitive sensor
Sensor element temperature passive (opt.):	at customer's option
Measuring range humidity:	0 … 100% r.h.
Output humidity:	0 … 10 V or 4 … 20 mA
Tolerance humidity 35% … 70% r.h.:	± 2% (25 … 90% r.h.)
Measuring range temperature:	-30 °C … +120 °C
Active output signal temperature	0 … 10 V or 4 … 20 mA
Tolerance temperature:	± 0,5 K
Load at analogue output (0...10 V):	10 ... 100 kOhms
Analogue output burden (4 … 20 mA):	300 … 1000 Ohms
Operating temperature:	-30 °C … +120 °C
Operating range:	0 … 98% r.h.
Response time (r.h.):	8 Sec. (at 63% condensation)
Power supply cord:	Silicone up to 180 °C
Protection sleeve:	12 x 150 mm stainless steel
Length supply cord:	2 meters (Standard)
Connection:	Screw clamps max. 1.5 mm
Housing:	PA6 15% GK, Colour RAL 9010
Measurements housing:	75 x 69 x 44 mm
Protection class:	IP65
Sensor protection:	Sinterfilter, brass

Technical Drawing ARF/R-X/HT



Overview (Product Group 1)

Typ	Output humidity	Output temperatur	Display		Optional	
ARFT/R-U/HT	0 … 10 V	0 … 10 V	-		Relay	
ARFT/R-I/HT	4 … 20 mA	4 … 20 mA	-			
ARFTP/R-xxx/HT	0 … 10 V	passive	-			
ARFT/R-U/HT-D	0 … 10 V	0 … 10 V	incl.			
ARFT/R-I/HT-D	4 … 20 mA	4 … 20 mA	incl.			
ARFTP/R-xxx/HT-D	0 … 10 V	passive	incl.			

Order example: High Temperature/Humidity Sensor with 4-20 mA output signal = ARFT/R-I/HT

Special models available on demand.

CONDENSATION MONITOR KDW2 AND KDW2ext

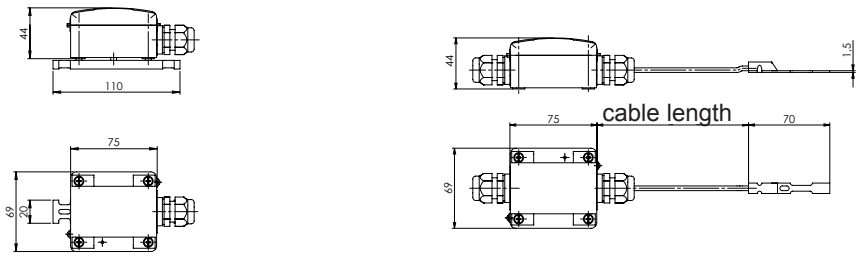
3 Years Warranty

Application

Our KDW2 and KDW2EXT condensation monitors are typically mounted to cooling and cold water pipes, cooling ceilings or other cooled surfaces. Both models offer reliable detection of condensation and protect the objects against the former. The KDW2Ext has an external measuring point and can easily be mounted in confined spaces. Our KDWs can be used as monitors on cooling ceilings and pipes and the additional internal switching output is capable of activating heatings or other actuators.

Technical Data	
Sensor system	
Switching point:	Adjustable between 80 and 100 %
Switching hysteresis:	ca 5% r. h.
Operating range:	0 … 100% r.h.
Operating temperature:	-30 °C … +70 °C
Dew:	admissible
Condensation:	briefly admissible
Medium:	Ambient air without atmospheric pollution
Response time:	120 sec at switching point from 75 % to condensation
Power supply cord (KDWext)	2000 mm Silicone up to 180 °C
Electric supply	
Power supply:	20 … .34 VAC/VDC
Operating current (24 VDC):	max. 30 mA with energized relay
Relais :	max. 15 mA with deenergized relay
Function control:	LED
LED :	red when relay is energized
Output circuit	
Switchting characteristics:	Isolated relay with switching contact, closed at normal operation (condensate-free). Open atmissing operating voltage or forming of condensation
Contact load:	max. 60 Vss
Switching current:	Max. 1 A AC / DC
Display:	LED green (Relay deenergized)
	LED red (Relay energized)
Switching capacity Relay:	60 V / 1A

Technical Drawing KDW2 and KDW2ext

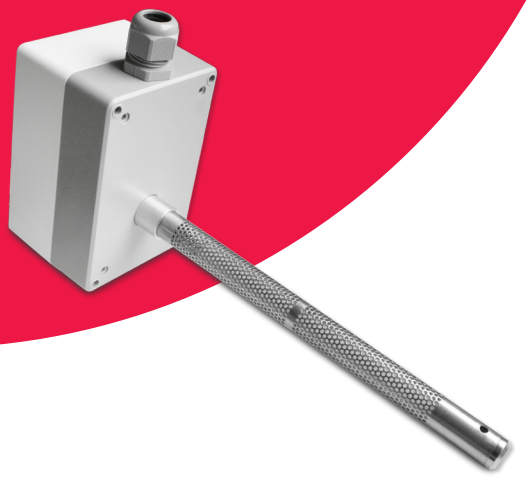


Overview (Product Group 1)

Type	Output	Display	
KDW2	Relay	-	
KDW2ext	Relay	-	

Order example: Condensation Monitor = KDW2

Special models available on demand.



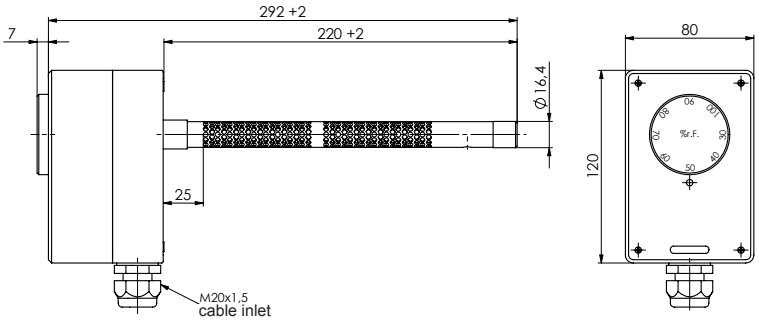
DUCT HYGROSTAT WITH INTERNAL AND EXTERNAL CONTROLS - KHY

Application

The HG80 Hygrostat is a two-level controller for controlling the relative humidity in air ducts of air-conditioning system, conditioning cabinets. The device is also applied in food storages, cooling chambers for fruits and vegatables, greenhouses of gardening companies, textile industry, paper and printing industry, movie industry and hospitals - basically in all places where humidity monitoring and control is required.

Technical Data	
Scale:	30 … 100 % r.h.
Accuracy:	± 3,5% r.h. > 50% r. h. ± 4% r. h. < 50% r. h.
Operating range:	35 … 95% r. h.
Medium:	Air (nonaggressiv), depressurized
Differential gap:	at 50% r. h. ca. 4% r. h.
Max voltage:	250 VAC
Switching capacity changeover contact	Ohmic load (cos phi=1) 15A AC 230 V Inductive load (co phi=0,7) 2A AC 230 V Voltage 0,25A DC 230 V
Switching capacity, minimum load:	100 mA, 125 VAC
Weight:	700 g
Protection class KHY-A:	IP54
Protection class KHY-I:	IP65
Protection rating:	III
Admissible air velocity	8 m/sec
Medium temperature:	
Operating temperature:	0 °C … +60 °C
Storage temperature:	-30 °C … +60 °C

Technical Drawing KHY



Overview (Product Group 2)

Type	Reset	
KHY-A	external	
KHY-I	internal	

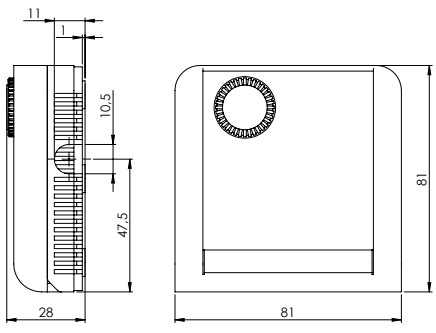
INDOOR HYGROSTAT WITH INTERNAL AND EXTERNAL CONTROLS - RHY

Application

The Indoor Hygrostat is a two-level controller for controlling the relative humidity. The device is typically used for controlling air moistening and demoistening in office spaces and IT rooms. The device is also applied in food storages, cooling chambers for fruits and vegatables, greenhouses of gardening companies, textile industry, paper and printing industry, movie industry and hospitals. The Hygroswitch features an internal adjustment wheel with scale instead of an external control knob. The wheel must be aligned according to the red indication marks.

Technical Data	
Scale:	30 … 100 % r.h.
Accuracy:	± 3,0% r.h. > 40% r. h. ± 4,0% r. h < 40% r. h.
Operating range:	35 … 95% r. h.
Medium:	Air (nonaggressiv), depressurized
Differential gap:	at 50% r. h. ca. 4% r. h.
Switching capacity:	max. 250 VAC and 0,1...5A at ohmic load for demoistening 0,1...2A at ohmic load for moistening 0,1...1A at inductive load with cos phi=0.7
Life span:	around 100.000 operation cycles
Weight:	58 g
Protection class:	IP30D
Operating temperature:	0 °C … +60 °C
Storage temperature:	-40 °C … +60 °C

Technical Drawing RHY



Overview (Product Group 1)

Type	Reset	
RHY-A	external	
RHY-I	internal	

Order example: Indoor Hygrostat with external controls = RHY-A

Special models available on demand.

ACCESSORIES

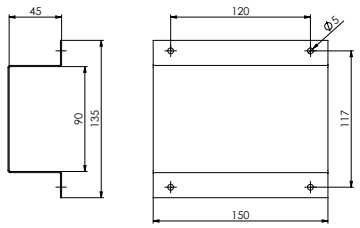
Sun Protection Cover/Physical Impact Protection Cover

Cover to protect outdoor/indoor temperature/humidity sensors against mechanical impact or extreme weather conditions

Overview (Product Group 1)

Typ	
G25.1	

Technical Drawing G-25.1



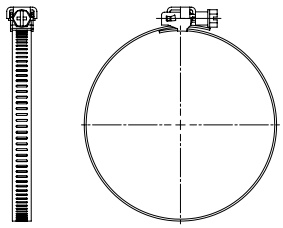
Tension band for contact sensors

For mounting contact sensors on drain pipes/pipes.

Overview (Product Group 1)

Typ	
Z-65 (60-110 mm)	
Z-66 (32-50 mm)	

Tension band Z-65 / Z-66



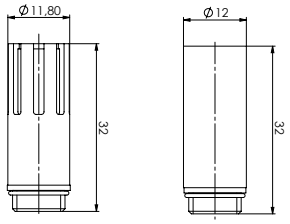
Plastic filter for humidity sensors

As replacement and for faster response time

Overview (Product Group 1)

Type	
Plastic - Z-228	
Polyethylene - Z-227	

Plastic filter



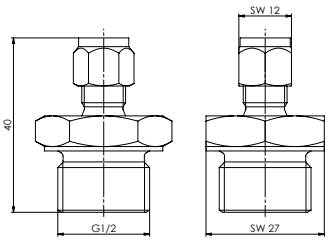
Screw clamps

For easy mounting of duct humidity sensors

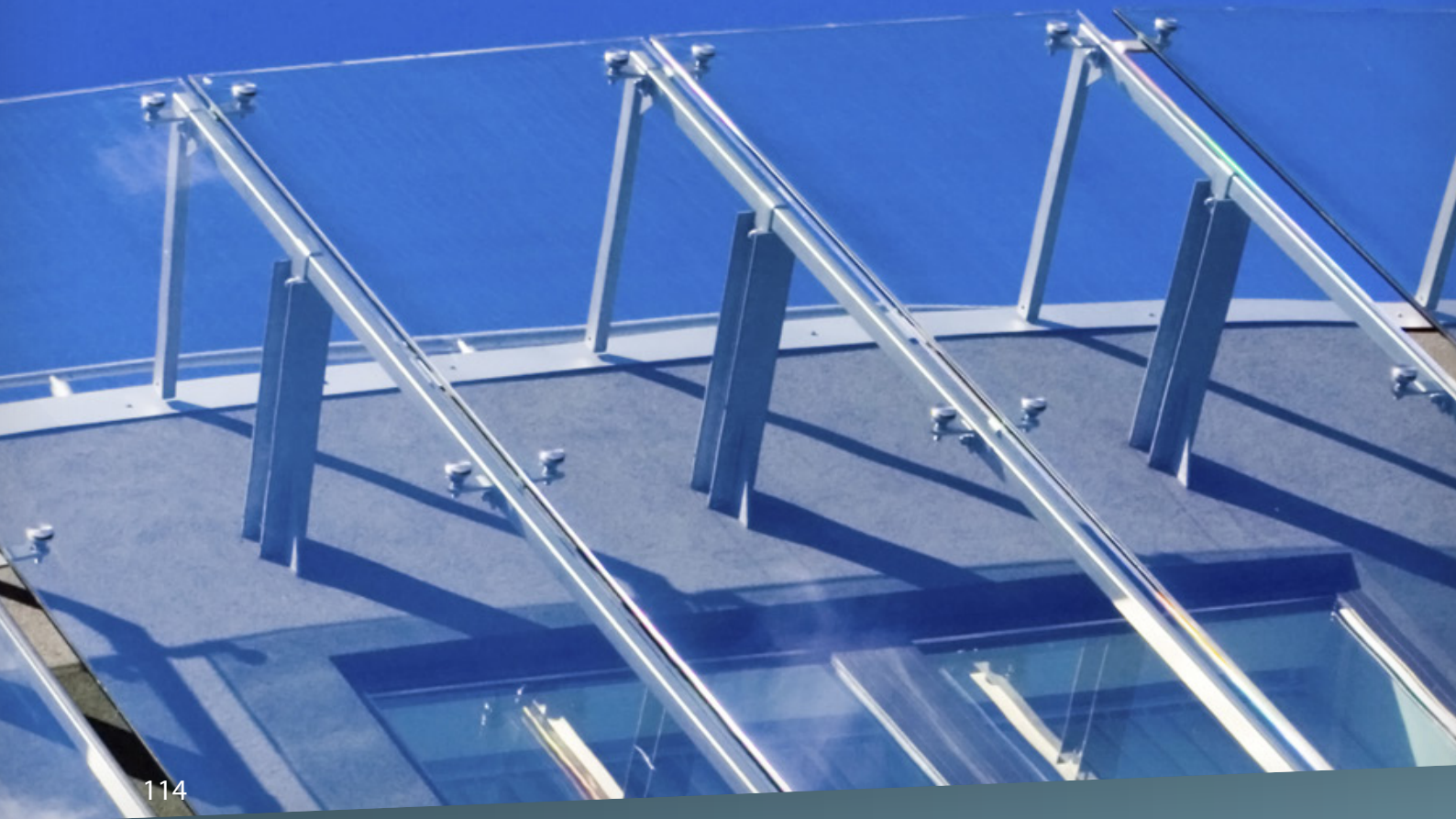
Overview (Product Group 1)

Type	Thread	Clamp ring	Drill hole	
KVG1/2-VA-VA-12.0	G1/2"	Stainless steel	12mm	
KVG1/2-VA-TE-12.0	G1/2"	PTFE	12mm	

Screw clamps



CO2 + AIR QUALITY



AIR QUALITY SENSOR - INDOOR AIR QUALITY SENSOR - DUCT AIR QUALITY SENSOR

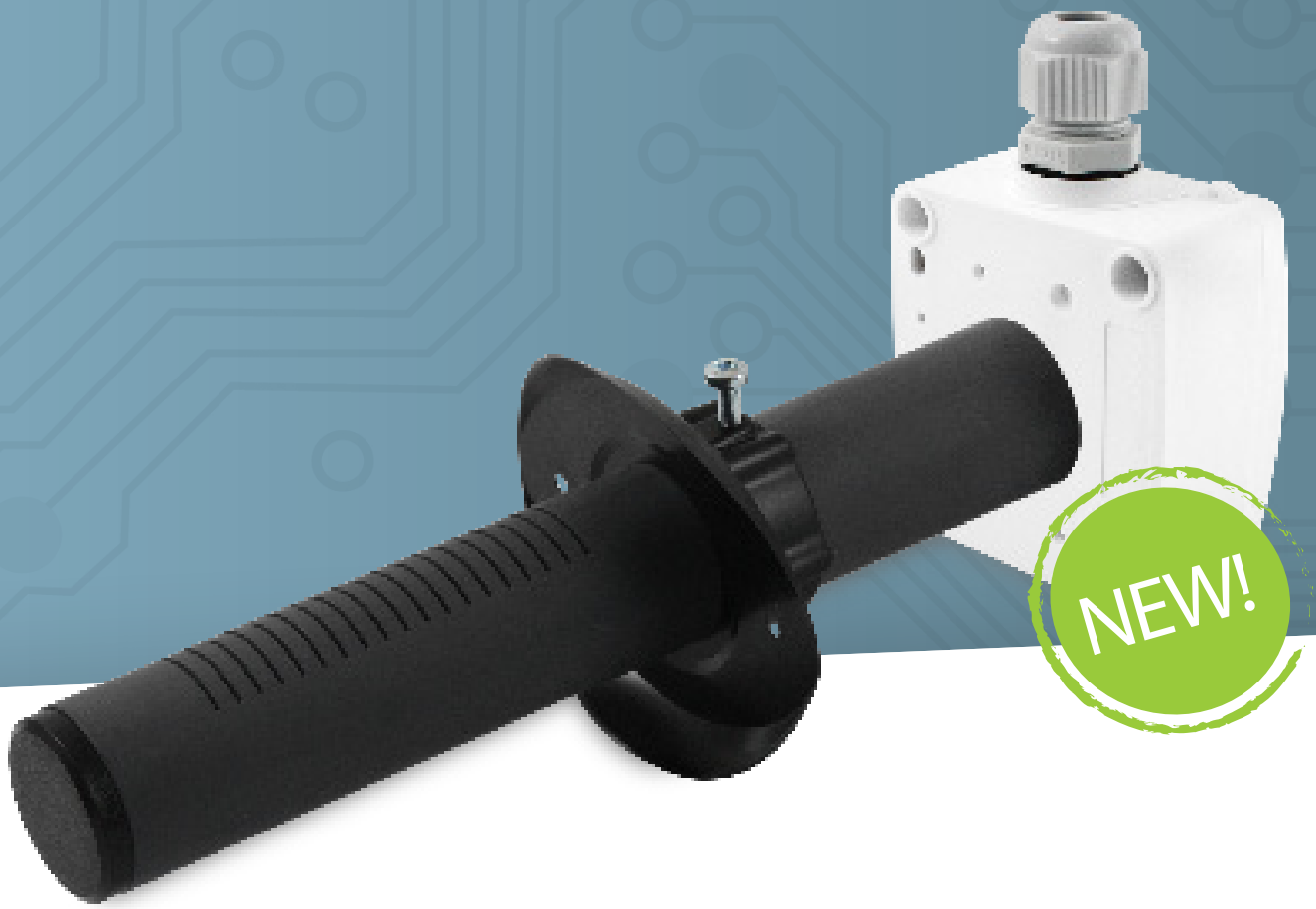
The term "air quality" describes the composition of ambient air with respect to pollution. The respective threshold and guide values are defined by laws and regulations.

Air monitoring is carried out with the help of emission measuring networks. As a rule, the respective measuring stations function independent of each other. Modern systems transfer the measured values to host computers fully automatic.

With regards to air quality, TiTEC offers - amongst others -the newest generation of digital VOC sensors with reduced power consumption and an LED traffic light color scheme.

Our carbon-monoxide measuring systems are state-of-the-art as well: The digital NDIR sensor is highly energyefficient, offers long-termstability and does not require recalibration.

CO2 + AIR QUALITY



DESIGN, EFFIZIENCY AND FUNCTION

The air quality describes the quality of the air regarding to impurities. Corresponding limits or guidelines are defined by laws and regulations. The individual stations basically operate independently. Modern systems transmit the measurement results automatically to a central computer.

Titec offers for measurement tasks in the field of air quality and carbon dioxide measurement, among other things, the latest generation of digital sensors, which operate extremely energy-efficient at meanwile a long-term stability.

In addition, no calibration is required by the wide range of requirements of our proven sensor technology is to do justice, while ensuring a high level of functionality and ease of use, we have revised the portfolio room units.

The sensor system was easily sold to increase the measurement accuracy, in addition there is the option of a relay output and potentiometer in passive and active design. In addition, both types can be equipped with traffic light function by color LED and optional power-saving e-paper display.

PLAIN, BUT STILL A KIND OF UNIQUE
EASY MOUNTABLE // STURDY // SAFE

In combination with humidtiy or temperature sensor adjustable via DIP-Switch:
- 4 Measuring ranges
- Relative Humidity
- Absolute Humidity
- Dew point
- MIxing ration
- Enthalpy

INDOOR AIR QUALITY SENSOR WITH LED DISPLAY - RALQA-U/RALQA-I

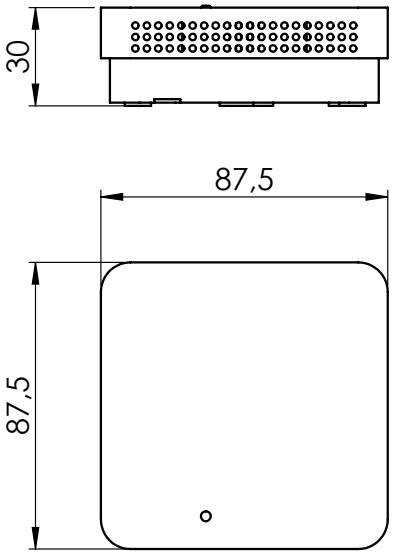
Application

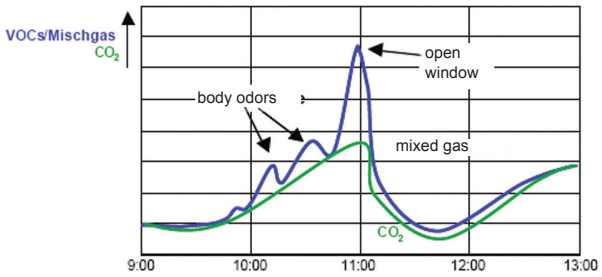
For measuring the air quality in living and office spaces etc, optionally with 0-10 V or 4-20 mA output. The RALQA-U/RALQA-I is a VOC/ mixed gas sensor The CO2 equivalents are derived from a conforming algorithm as the odor emissions are overlaying the CO2 value (see graphics). Long-term drifting and operational deterioration can be eliminated by regularly running the automatic calibration. The integrated LED displays the quality of the air by means of an LED color scheme. Green means good, yellow means average and red means poor.

3 Years Warranty

Technical Data	RALQA-U / RALQA-I
Power supply:	12 … .34 VAC/VDC
Output:	0 … 10 V or 4 … 20 mA
Measuring range:	0 … 2000 ppm
Analogue output load:	min. Load resistance 10 kOhm / load 600 Ohm
Operating temperature:	0 °C … +50 °C
Housing:	Material ABS, Colour RAL 9010
Measurements housing:	87,5 x 87,5 x 30 mm
Connection:	Screw clamps max. 1.5 mm²
Protection class:	IP20
Ampel:	Green LED at 0 … 800 ppm Orange LED at 800 … 1600 ppm RED LED at 1600 … 2000 ppm

Technical Drawing RALQA





Overview (Product Group 1)

Type	Output ppm	Output temp.	Output humidity	Price	Optional	
RALQA / U	0-10 V	-	-	175,00 €	Display	
RALQA / I	4-20 mA	-	-	185,00 €	Relay	
RALQA / T-U	0-10 V	0-10 V	-	195,00 €	Poti passive	
RALQA / T-I	4-20 mA	4-20 mA	-	185,00 €	Poti active	
RALQA / T / F - U	0-10 V	0-10 V	0-10 V	195,00 €	CO2 sensor	
RALQA / F - I	4-20 mA	-	4-20 mA	195,00 €		

An additional passive sensor is available for all models, please indicate sensor type when ordering.

Order example: Room Air Quality Sensor with LED Display and 4-20 mA output = RALQA-I

Special models available on demand.

INDOOR AIR QUALITY SENSOR - RALQ-U / RALQ-I

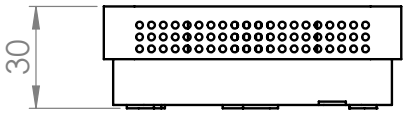
3 Years Warranty

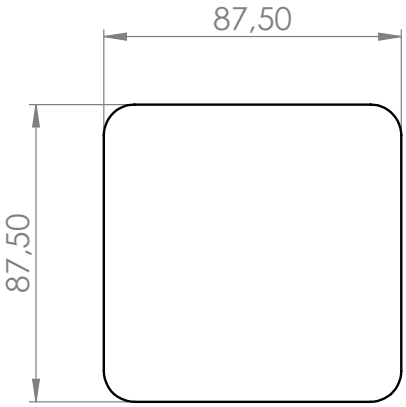
Application

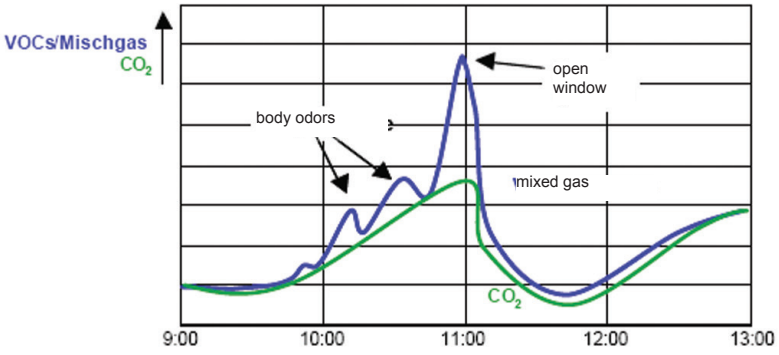
For measuring the air quality in living and office spaces etc, optionally with 0-10 V or 4-20 mA output. The RALQ-U/RALQ-I is a VOC/mixed gas sensor The CO2 equivalents are derived from a conforming algorithm as the odor emissions are overlaying the CO2 value (see graphics). Long-term drifting and operational deterioration can be eliminated by regularly running the automatic calibration.

Technical Data	
Power supply:	12 … 34 VAC/VDC
Measuring range:	0-2000 ppm
Power consumption:	max. 45 mA
Output:	0 … 10 V or 4 … 20 mA
Calibration:	1 V … 5,6 mA = 200 ppm CO_2 equivalent 5 V … 12 mA = 1000 ppm CO_2 equivalent 10 V … 20 mA = 2000 ppm CO_2 equivalent
Operating temperature:	0 °C … +50 °C
Humidity:	5 … 95 r.h.
Protection class:	IP20
Housing:	Material ABS, Colour RAL 9010
Measurements housing:	87,5 x 87,5 x 30 mm

Technical Drawing RALQ-U / RALQ-I







Overview (Product Group 1)

Typ	Output ppm	Output temp.	Output humidity		Optional	
RALQ / U	0-10 V	-	-		Display	
RALQ / I	4-20 mA	-	-		Relay	
RALQ / T - U	0-10 V	0-10 V	-		Poti passive	
RALQ / T - I	4-20 mA	4-20 mA	-		Poti active	
RALQ / T / F - U	0-10 V	0-10 V	0-10 V		CO2 sensor	
RALQ / F - I	4-20 mA	-	4-20 mA			

An additional passive sensor is available for all models, please indicate sensor type when ordering.

Order example: Indoor Air Quality Sensor 0-10V output = RALQ-U

Special models available on demand.

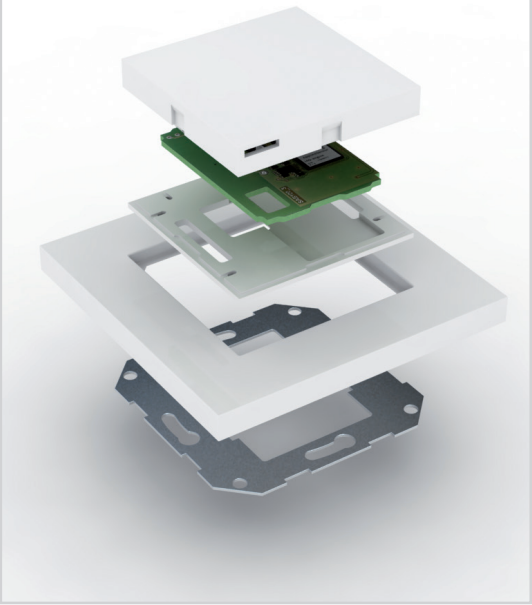
INDOOR AIR QUALITY SENSOR (FLUSH-MOUNTED) - RALQ-UP

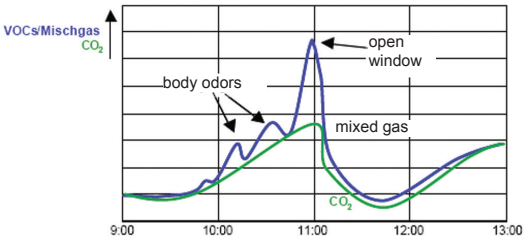
Application

The sensor is equipped with a 0-10 V/DC output signal and is available for up to 3 measuring categories (only available as VOC sensor for the moment). The VOCup can be combined with the following switch series: GIRA E2, Event / Merten System M / Jung A500, Ap581, AS500 / Berker B.1, B.7

Technical Data	
Sensor system	
VOC sensor:	Metal oxide sensor with semi-automatic calibration
Fields of application::	Indoors 0°C...+50°C, 5..95% r.h. (without dewing)
Measuring range:	450 … 2000 ppm CO_2 equivalent
Elektronics	
Supply voltage:	12 … 25 VAC or 12 … 25 VDC
Power consumption:	14 mA at 24 VDC
Signal output:	0 … 10 VDC (Standard)
Warm-up phase:	15 min after current contact
Measurements	
Casing (Wx H):	55 x 55 mm
Casing depth:	ca. 10 mm
Wall mounting:	receptacle provided by customer, Ø 60 mm, with steel mounting plate
Connections:	Plug with screw clamps for 0.25-1.5 mm2 (cable/strand)
Casing:	Plastic (partially painted) Pure white, gloss (similar to RAL 9010), matt or special colors

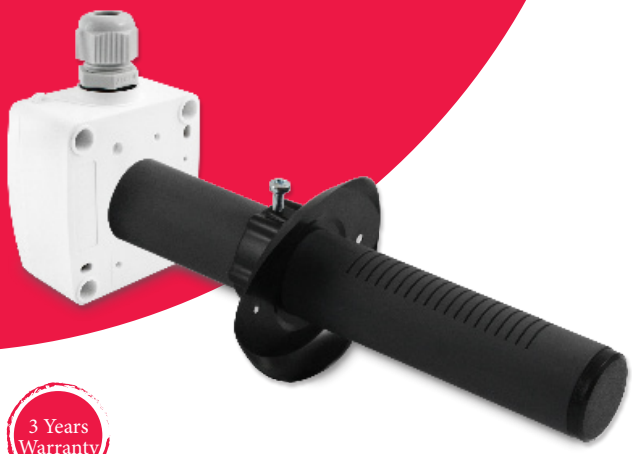
Technical Drawing RALQ-UP





Overview (Product Group 2)

Type	Output	
RALQ-UP	0 … 10 V	



3 Years Warranty

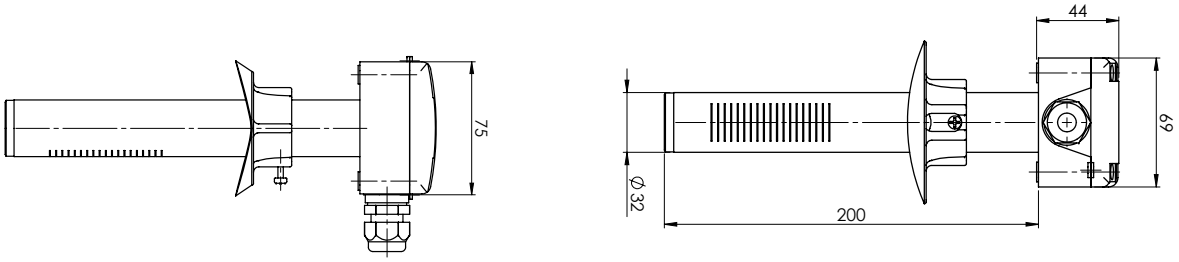
DUCT AIR QUALITY SENSOR - KALQ-U / KALQ-I

Application

For measuring the air quality in ducts of air-conditioning systems, optionally with 0-10 V or 4-20 mA output. The RALQ-U/ RALQ-I is a VOC/mixed gas sensor The CO2 equivalents are derived from a conforming algorithm as the odor emissions are overlaying the CO2 value (see graphics). Long-term drifting and operational deterioration can be eliminated by regularly running the automatic calibration.

Technical Data	
Power supply:	12 … 34 VAC/VDC
Power consumption:	max. 45 mA
Output:	0 … 10 V or 4 … 20 mA
Measuring range:	0-2000 ppm
Calibration:	1 V … 5,6 mA = 200 ppm CO_2 equivalent 5 V … 12 mA = 1000 ppm CO_2 equivalent 10 V … 20 mA = 2000 ppm CO_2 equivalent
Operating temperature:	0 °C … +50 °C
Humidity:	5 … 95 r.h.
Protection class:	IP65 (Housing)
Housing:	ABS
Mountingmaterial (incl.):	Mounting flange

Technical Drawing KALQ-U / KALQ-I



Overview (Product Group 1)

Typ	Output ppm	Output temp.	Output humidity		Optional	
KALQ / U	0-10 V	-	-		Display	
KALQ / T-U	0-10 V	0-10 V	-		Relay	
KALQ / T / F-U	0-10 V	0-10 V	0-10 V		CO2 sensor	
KALQ / I	4-20 mA	-	-			
KALQ / T-I	4-20 mA	4-20 mA	-			
KALQ / F-I	4-20 mA	-	4-20 mA			

An additional passive sensor is available for all models, please indicate sensor type when ordering.

Order example: Duct Air Quality Sensor with 0-10V output = KALQ-U

Special models available on demand.

INDOOR SENSOR FOR CARBON DIOXIDE AND TEMPERATURE- RACO2

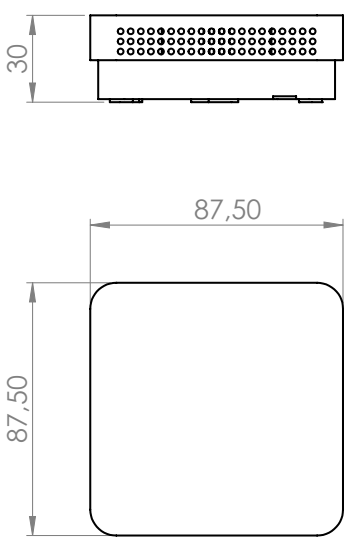
Application

Our RACO2 records the ambient air's CO2 concentration in living and office spaces. The RACO2 converts the the values mesuared in the ranges of optionally 0-2000 ppm or 0-5000 ppm into a linear 0-10 V output signal. The CO2 value is measured via the NDIR sensor, which is able to compensate possible pollution with the help of its 2-ray measuring principle. Optionally, our RACO2 is available with an additional sensor for measuring temperature and humidity.

3 Years Warranty

Technical Data	
Power supply:	12 … .34 VAC/VDC
Power consumption:	100 ... 130 mA
Electrical connection:	Screw clamps
Output:	0 … 10 V or 4-20 mA
Sensor element:	(NDIR) sensor with automatic background calibration
Measuring range CO_2:	0 … 2000 ppm / 0 ... 5000 ppm
Accuracy:	< ± (50ppm +2% of scale reading) at 25°C and 1013 mbar
Optional:	
Temperature:	0 … 10 V or 4-20 mA
Accuracy:	± 0,2 K + max 3% full scale
Humidity:	0 … 10 V or 4-20 mA
Accuracy:	< ± 3% bei 25 °C between 10 … 90% r.F.
Operating temperature:	0 °C … +50 °C
Humidity:	10 … 95 r.h.
Protection class:	IP30
Housing:	Material ABS
Colour:	RAL 9010

Technical Drawing RACO2



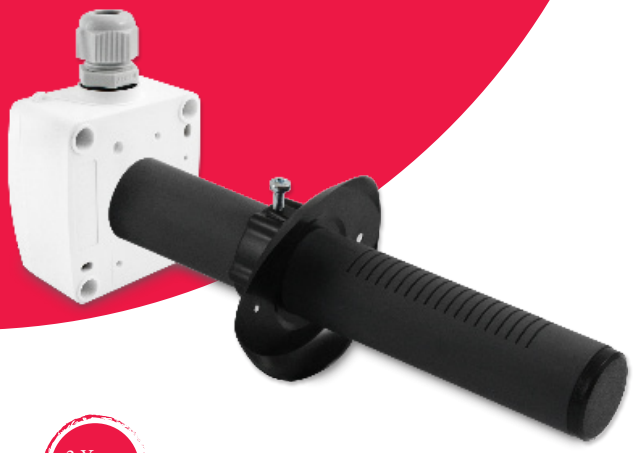
Overview (Product Group 1)

Typ	Output ppm	Output temp.	Output humidity		Optional	
RACO2 / U	0-10 V	-	-		Display	
RACO2 / T-U	0-10 V	0-10 V	-		Relay	
RACO2 / T / F-U	0-10 V	0-10 V	0-10 V		Poti passive	
RACO2 / I	4-20 mA	-	-		Poti active	
RACO2 / T-I	4-20 mA	4-20 mA	-		CO2 sensor	
RACO2 / F-I	4-20 mA	-	4-20 mA		LED	

An additional passive sensor is available for all models, please indicate sensor type when ordering.

Order example: Indoor Sensor for CO2 with temperature and humidity function and 0-10 V output = RACO2/T/F

Special models available on demand.



3 Years Warranty

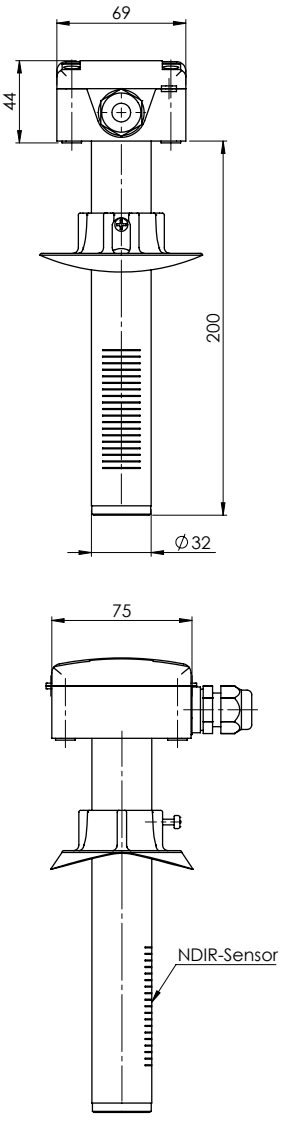
DUCT SENSOR FOR CARBON DIOXIDE MEASUREMENTS - KACO2

Application

Our KACO2 records the ambient air's CO2 concentration in air ducts of air-conditioning systems. The KACO2 converts the the values measured in the ranges of optionally 0-2000 ppm or 0-5000 ppm into a linear 0-10 V output signal. The CO2 value is measured via the NDIR sensor, which is able to compensate possible pollution with the help of its 2-ray measuring principle. Optionally, our KACO2 is available with an additional sensor for measuring temperature and humidity.

Technical Data	
Power supply:	12 … 34 VAC/VDC
Power consumption:	< 9 mA
Electrical connection:	Screw clamps
Output:	0 … 10 V or 4-20 mA
Sensor element:	(NDIR) sensor with automatic background calibration
Measuring range CO_2:	0 … 2000 ppm / 0 ... 5000 ppm
Accuracy:	< ± (50ppm 2% of scale reading) at 25°C and 1013 mbar
Optional:	
Temperature:	0 … 10 V or 4-20 mA
Accuracy:	± 0,2 K + max 3% full scale
Humidity:	0 … 10 V or 4-20 mA
Accuracy :	<± 3% at 25°C between 10...90% r.h.
Operating temperature:	0 °C … +50 °C
Humidity:	10 … 95 r.h.
Protection class:	IP65 (Housing)
Housing:	Plastic
Mounting equipment (incl.):	Mounting flange

Technical Drawing KACO2



Overview (Product Group 1)

Typ	Output ppm	Output temp.	Output humidity	
KACO2 / U	0-10 V	-	-	
KACO2 / T-U	0-10 V	0-10 V	-	
KACO2 / T / F-U	0-10 V	0-10 V	0-10 V	
KACO2 / I	4-20 mA	-	-	
KACO2 / T-I	4-20 mA	4-20 mA	-	
KACO2 / F-I	4-20 mA	-	4-20 mA	

Optional	
Display	
Mounting flange	
VOC-Sensor (only 0-10V Version)	
Relay	

An additional passive sensor is available for all models, please indicate sensor type when ordering.

Order example: Duct sensor for CO2 with temperature and humidity function and 0-10 V output = KACO2 / T / F-U

Special models available on demand.

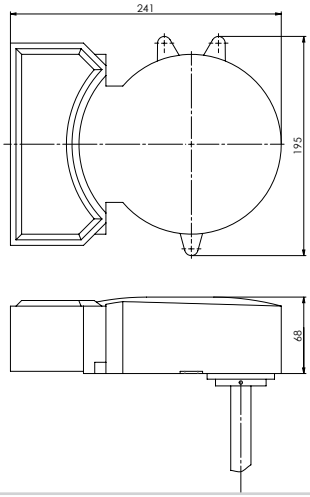
DUCT SMOKE DETECTOR - UG-5-AFR

Application

Designed specifically for use for smoke detection in ventilation ducts, the UG-5 AFR combines a conventional smoke detector with an Adapter system and finds particular application in the building. All housing components were focused on optimal airflow flow constructed, allowing the device to be integrated at each channel page in four different positions in the system: 0 °; 90 °, 180 ° and 270 °. The UG-5 AFR has an integrated controller to control fire dampers and fans (optional DIBt certification required), as well as to Activation of acoustic and / or visual alarms.

Technical Data	
Power supply:	24 VAC/VDC oder 230V AC
Measuring principle:	Photoelectric scanning
Power consumption:	max. 30 mA at 230 VAC, max. 220 mA at 24 VAC / VDC
Alarm:	2 x potential free change max. 250 V (8 A), 3 x potential
	free NO contact max. 250 V (5 A)
Features:	LED on the smoke detector, service alarm, smoke alarm, system failure alarm memory
Housing:	ABS synthetics
Material:	Protection sleeve: Aluminium
Measurements:	Venturi tube: length 0.6 m, hole diameter 38 mm
Weight:	1100 g
Protection class:	IP54
Protection rating:	II
Flow rate:	1-20 m/s
Operating temperature:	-10 °C … +55 °C
Norms:	VdS G205041, CE conformity, EN 54-27, DIBt Z-78.6-232

Technical Drawing UG-5-AFR



Overview (Product Group 2)

Type	Power supply	Output	Norms	
UG-5-AFR-24V	24 VAC/DC	2 Changeover contact, 3 Open contacts	VdS, CE	
UG-5-AFR-24V-Z	24 VAC/DC	2 Changeover contact, 3 Open contacts	VdS, CE, DIBt	
UG-5-AFR-24V-MB	24 VAC/DC	2 Changeover contact, 3 Open contacts, Modbus	VdS, CE	
UG-5-AFR-24V-MB-Z	24 VAC/DC	2 Changeover contact, 3 Open contacts, Modbus	VdS, CE, DIBt	
UG-5-AFR-230V	230 VAC	2 Changeover contact, 3 Open contacts	VdS, CE	
UG-5-AFR-230V-Z	230 VAC	2 Changeover contact, 3 Open contacts	VdS, CE, DIBt	
UG-5-AFR-230V-MB	230 VAC	2 Changeover contact, 3 Open contacts, Modbus	VdS, CE	
UG-5-AFR-230V-MB-Z	230 VAC	2 Changeover contact, 3 Open contacts, Modbus	VdS, CE, DIBt	
Accessories:				
ST5	Venturi tube 1,5m			
ST9	Venturi tube 2,8m			
UG-MB-75	Mounting bracket			
UG-COVER-75	Waterproof housing			

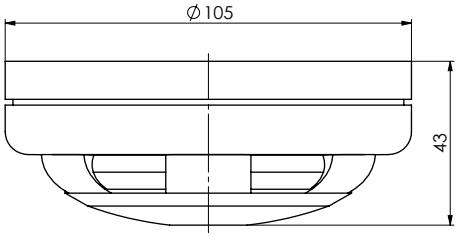
OPTICAL SMOKE DETECTOR - EVC-PY-DA

Application

Thanks to the equipment with a new optical chamber and associated light source the highest precision is ensured in detecting even the smallest particles in the initial phase of a fire, causing the EVC-PY-DA ideal for use in almost all industrial, as well as building services applications. The built-in automatic sensitivity adjustment extended beyond the life of the smoke detector and minimizes the number of false alarms. The robust housing design ensures the device almost completely against negative environmental influences such as pollution or radio frequency interference, but which are detected in time in case of need by the intelligent monitoring circuit of the device and reported by an LED.

Technical Data	
Power supply:	16 … 30 VDC
Power consumption:	max. 50 µA
Alarm current::	50 mA
Servic alarm current:	ca. 13 mA
Operating temperature:	-20 °C … +50 °C
Max. air humidity:	99% r.h.
Sensitivity:	acc. EN-54-7
Tests according to EN-54EN-54:	VdS (Germany)
Weight:	ca. 150g
Service alarm:	green LED
Smoke alarm:	red LED
Protection class:	IP22 socket

Technical Drawing EVC-PY-DA



Overview (Product Group 2)

Type	Description	
EVC-PY-DA+UB6	Ceiling mounted smoke detector	
ABAV-S3-24V	24V power supply unit	
ABAV-S3-230V	230V power supply unit	


MOTION + LIGHT

MOTION AND LIGHT SENSORS - PIRLUX

"Motion" in the physical sense is defined as an object's change of place over time.

"Light" signifies the part of electromagnetic waves that are visible to the eye. The range comprises wave lengths between 380 to 780 nm.

Infrared rays/UV rays not visible to the human eye are usually also termed as "light".

The PIRLUX Motion Sensor has a function that allows for automatic threshold setting with regards to movements with the help of a potentiometer, making unneccessary switching throughout the day obsolete.
The digital sensor features an integrated filter for the measurement of light in order to reproduce the characteristics of the human eye as realistically as possible.

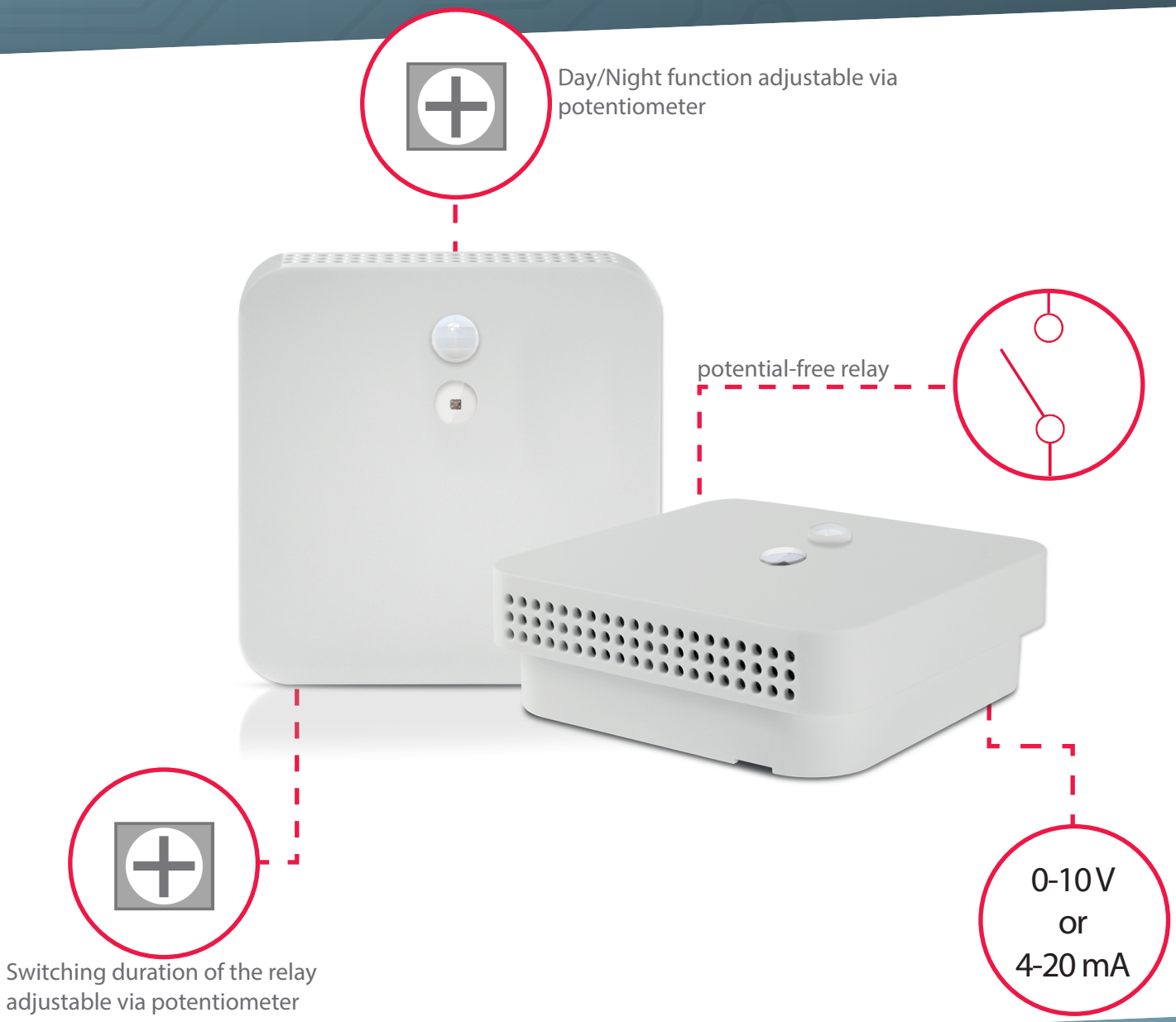
MOTION + LIGHT

PIRLUX: MOTION AND LIGHT SENSOR

In many industrial, as well as private use areas the detection of movement and light is becoming increasingly important.
In particular in the field of building security, but also in growing markets, such as industrial process automation or home automation motion and light sensors is considered a central component.

For this reason, we attach great importance to the quality and efficiency of our product lines and PIR PIRLUX which are ideal through their individual combinations for a wide range of different applications.

Our combi boiler IPIRLUX characterized by manual adjustability of the shift shaft via a potentiometer, whereby redundant circuits can be prevented. To ensure an accurate light measurement, the system's digital sensor works with an integrated filter to image the eye characteristic as realistically as possible.


Day/Night function adjustable via potentiometer
potential-free relay
Switching duration of the relay adjustable via potentiometer
0-10 V
or
4-20 mA

MOTION AND LIGHT SENSOR OUTDOOR - APIRLUX

Application

The combination sensor for motion and light can be used both indoors and outdoors. The light sensor is equipped with a DIP switch for 4 different light levels. The motion sensor's time constant of the relay output can be set between 1 second and 10 minutes.

Technical Data	
Power supply:	12 … .34 VAC/VDC
Analogoutput U:	min. Load resistance 10 kOhm
Analogoutput I:	Load: 300 … 1000 Ohm
Power input::	Relay PIR 60 VDC / 1A
Accuracy LUX:	± 10%
Measuring range LUX:	4 Measuring ranges available
Operating temperature:	-15 °C … +70 °C
Connection:	Screw clamps max. 1.5mm²
Protection class:	IP54
Norms:	CE, EMC pursuant to EN 61326-1 2006, EMC directive 89/336/EEC

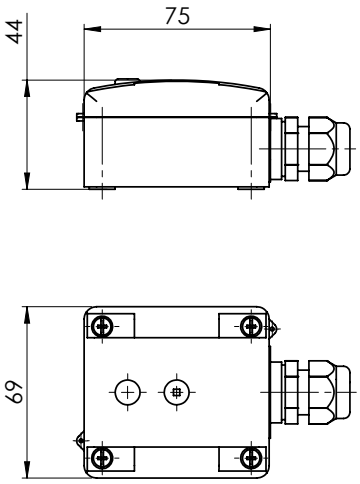
Measuring ranges		
Measuring range Lux	1	2
0 … 1000	OFF	OFF
0 … 10000	ON	OFF
0 … 50000	OFF	ON
0 … 100000	ON	ON

Motion and light detection sensor

Light sensor: Active output: 0-10 V or 4-20 mA
various measuring ranges

Motion sensor: Relay output with time setting

Technical Drawing PIRLUX



Overview (Product Group 1)

Type	Output	
APIRLUX / U	Relay / 0 … 10 V	
APIRLUX / I	Relay / 4 … 20 mA	
APIR	Relay	
ALUX / U	0 … 10 V	
ALUX / I	4 … 20 mA	

Order example: Outdoor sensor with motion and light sensor and 0-10 V output = APIRLUX-U

Special models available on demand.

3 Years Warranty

MOTION AND LIGHT SENSOR INDOOR- IPIRLUX

Application

The combination sensor for motion and light can be used both indoors and outdoors. The light sensor is equipped with a DIP switch for 4 different light levels. The motion sensor's time constant of the relay output can be set between 1 second and 10 minutes.

Technical Data	
Power supply:	12 … .34 VAC/VDC
Analogoutput U:	min. Load resistance 10 kOhm
Analogoutput I:	Load: 300 … 1000 Ohm
Power input:	Relay PIR 60 VDC / 1A
Housing:	Material ABS, Colour RAL 9010
Accuracy LUX:	± 10%
Measuring range LUX:	4 Measuring ranges available
Operating temperature:	0 °C … +50 °C
Connection:	Screw clamps max. 1.5mm²
Protection class:	IP30

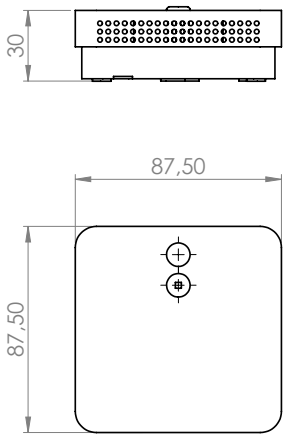
Measuring ranges		
Measuring range Lux	1	2
0 … 1000	OFF	OFF
0 … 10000	ON	OFF
0 … 50000	OFF	ON
0 … 100000	ON	ON

Motion and light detection sensor

Light sensor: Active output: 0-10 V or 4-20 mA
various measuring ranges

Motion sensor: Relay output with time setting

Technical Drawing PIRLUX



Overview (Product Group 1)

Type	Output	
IPIRLUX / U	Relay/ 0 … 10 V	
IPIRLUX / I	Relay/ 4 … 20 mA	
IPIR	Relay	
ILUX / U	0 … 10 V	
ILUX / I	4 … 20 mA	

Order example: Indoor sensor with motion and light sensor and 0-10 V output = IPIRLUX-U

Special models available on demand.

PRESSURE

MEASURING TRANSDUCER - PRESSURE TRANSMITTER - DIFFERENTIAL PRESSURE CONTROLLER

"Pressure" is the ratio of force to the area over which that force is distributed. Pressure is measured in Pascal.

TiTEC's solutions for pressure measurement feature digital sensors and are equipped with a potential-free switching output as standard. The DIP switch allows for a variety of measuring ranges.

PRESSURE

NEW!

PRESSURE TRANSDUCER

In particular in the industrial sector counts the pressure measurement of water and air to the elementary project components because the longevity and smooth functionality of results is monitored and ensured in critical areas.
This high standard of quality and function is what drives us to evaluate our product range in the field of pressure measurement regularly and optimize.

Thus, an almost continuously ongoing availability application-compatible pressure sensor ensures the highest, the current level of quality. All in-house versions of our service portfolio include digital sensors and are already equipped in the standard series with a floating signal output. The relay can be adjusted for specific applications by means of a potentiometer. The DIP switch opens up a diverse range selection.

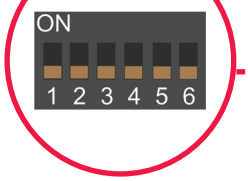
17 different standard measuring ranges

G1/2"
G1/4"
UNF 7/16

Offset manually adjustable +/-
10% adjustable via potentiometer

Pontetial-free Relay

Switching point of
internal relay settable
via potentiometer.



16 Measuring ranges
adjustable via DIP-Switch

filter duration pro-
grammble between
1s 10s via DIP-Switch

0-10 V
or
4-20 mA

DIFFERENTIAL PRESSURE CONTROLLER - DDW

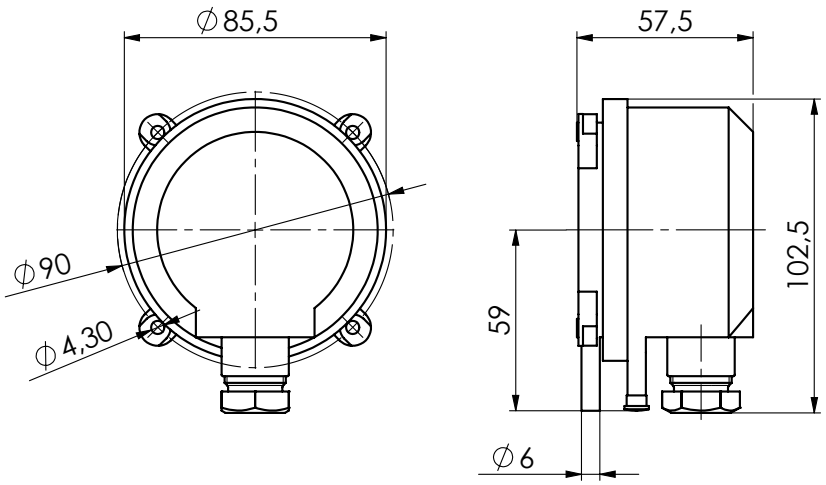
Application

For monitoring incombustible and non-aggressive gaseous media. Our Differential Pressure Controllers are available with various measuring ranges and are delivered as standard with a connection set. Further features:

- Adjustable with large scale
- Metric cable glands
- Duct connection nipples: length 60 mm
- Horizontal or vertical mounting position

Technical Data	
Pressure range:	see table
Pressure media:	Air, incombustible and nonaggressive gases
Protection class:	IP54
Housing:	Switch casing PA 6.6, fastening parts POM
Life span:	106 Switching operations
Material diaphragm:	Silicone
Temperature range:	-20 °C … +85 °C
Max. operating excess pressure:	50 mbar
Pressure connections:	Plastic with a diameter of 6.00 mm
Switching capacity:	1,0 A, 250 VAC
Electrical connection:	Blade terminal 6.3x0.8mm pursuant to DIN 64244 with screw clamps up to 2.5 mm²
Accessories	Mounting kit: 2 plastic duct connection nipples with mounting screws PVC hose Ø 6 mm

Technical Drawing DDW



Overview (Product Group 1)

Type	Pressure range	Differential gap	Tolerance	
DDW / H-10	20 … 300 Pa	10 Pa	± 15%	
DDW / H-20	30 … 400 Pa	15 Pa	± 15%	
DDW / H-40	50 … 500 Pa	20 Pa	± 15%	
DDW / H-50	200 … 1000 Pa	100 Pa	± 15%	

Order example: Differential Pressure Controller with pressure range of 50...500 Pa = DDW/H-40

Special models available on demand.

3 Years Warranty

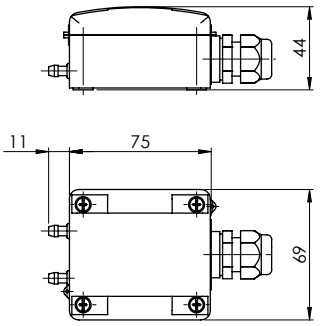
DIFFERENTIAL PRESSURE TRANSDUCER - DDMU1/2

Application

Digital diffential pressure transducer for overpressure, anderpressure and differential pressure Measurements. Various measuring ranges can be selected with the help of a DIP switch. The integrated potentiometer can be used for offset calibration, a second potentiometer is used for selector shaft adjustment of the integrated relay. Optionally, the differential pressure switch is available with a graphic 1.44" e-Paper display.

Technical Data	
Power supply:	20 … .34 VAC/VDC
Measuring ranges:	Settable via DIP-Switch Pressure range A = DDMX1 0 … 1/3 / 5 / 10 mbar -1 … +1/-3 … +3/-5 … +5/-10 … +10 mbar Pressure range B = DDMX2 0 … 20 / 30 / 50 / 70 mbar -20 … +20/-30 … +30/-50 … +50/-70 … + 0 mbar
Bursting pressure:	0,6 bar DDMU1 and DDMI1 1,2 bar DDMU2 and DDMI2
Characteristic deviation:	± 1,0% Fullscale + 0,5% full scale ± 1,0% Fullscale + 0,5% full scale
Medium:	clean, nonaggressive, noncondensing and nonflammable
Output:	0 … 10 V or 4 … 20 mA
Switching output:	Relay: NO/NC
Relay switching load:	1 A
Connection:	Screw clamps max. 1.5 mm²
Pressure type::	Differential pressure
Zero-point offset::	max. 5%
Operating temperature:	-5 °C … +65 °C
Admissiblee Humidity:	95 r.h. non-condensing
ConnectionHousing:	66 x 60 x 39 mm Polyamide, pure white, IP65
Pressure connection:	Stainless steel connection fitting
Accessories (incl.):	Pressure connection set with 2 air connection fittings and PVC hose
Optional:	Graphic e-Paper with 1.44" display Visible surface: 29 x 22mm Resolution: 128 x 96 Pixels

Technical Drawing DDMU1/2



Overview (Product Group 1)

Typ	Pressure range	Display	Output		
DDMU/1	A	-	0 … 10V		
DDMU/2	B	-	0 … 10V		
DDMI/1	A	-	4 … 20 mA		
DDMI/2	B	-	4 … 20 mA		
DDMU/1-D	A	incl.	0 … 10V		
DDMU/2-D	B	incl.	0 … 10V		
DDMI/1-D	A	incl.	4 … 20 mA		
DDMI/2-D	B	incl.	4 … 20 mA		

PRESSURE/DIFFERENTIAL PRESSURE TRANSDUCER - FDE28

Application

Digital pressure transducer for the measurement of excess pressure, negative pressure and differential pressure. This series' transmitter is well suited for a wide range of measurement tasks in the fields of heating and sanitary engineering. Typical areas of application: Differential pressure measurement between supply and return flow in heating systems or the surveillance of filters, compressors etc.

Technical Data

Pressure range (bar):	see table	
Nenndruck des Messsystems:	16 bar	
Max. Druckbelastung:	safe against excess pressure up to nominal pressure of the measurement system, (+) and (-)-sided	
Admissible ambient temperature:	0 °C … +70 °C	
Max. Storage temperature:	70 °C	
Protection class:	IP54 acc. DIN EN 60529	
Electrical connection:	3-wire	3-wire
Power supply:	24 VDC / VAC	24 VDC / VAC
Admissible supply voltage:	15 … 30 VDC 20 … 30 VAC	15 … 30 VDC 20 … 28 VDC
Output signal:	4 … 20 mA 0 … 20 mA	0 … 10 V
Material:		
Housing:	Polycarbonat	
Pressure chamber::	Brass	
Diaphragm:	NBR / Viton®	

Differential pressure transmitter FDE28 (Product Group 2)

Description		
Standard measuring ranges from 0-400 mbar to 0-6 bar without display Nominal pressure of measurement system: 16 bar Accuracy class 2.5 Operating voltage 24 VAC/DC		
Construction type	**Order Code**	
Measuring range		
0 … 400 mbar	8 3	
0 … 0,6 bar	0 1	
0 … 1 bar	0 2	
0 … 1,6 bar	0 3	
0 … 2,5 bar	0 4	
0 … 4 bar	0 5	
0 … 06 bar	0 6	
Construction type **Pressure chamber/membrane sealing**		
Brass / NBR	M	Standard
Brass / Viton®	N	
Pressure connections		
Innenthread socket G 1/8	0 0	Standard
Brass compression ring fitting for 6 mm tube	2 8	
Brass compression ring fitting for 8 mm tube	2 9	
Electrical connection		
5 m numbered cable	5	Standard
Electrical output signal		
0 … 20 mA / 3-wire Connection	A	Standard
0 … 10 V / 3-wire Connection	C	
4 … 20 mA / 3-wire Connection	P	
	FDE28 _ _ _ _ _ 5 _ L	

NEW!

3 Years Warranty

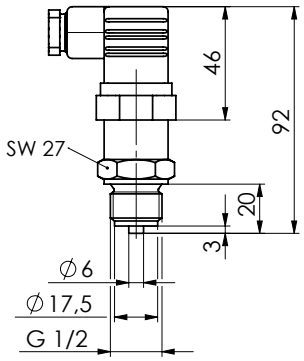
PRESSURE TRANSMITTER - DT1

Application

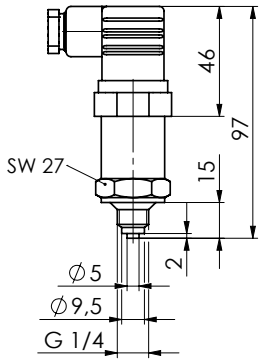
The pressure transmitter DT1 with ceramic measuring cell is ideal for measuring relative pressure of non-aggressive media. Areas like the building automation, industrial and pneumatic and hydraulic applications.

Technical Data	
Pressure range:	see table (order code)
Linearity:	< 1% FS (Fullscale)
Hysteresis:	< 0,5% FS
Admissible ambient temperature:	0 °C … +60 °C
Admissible medium temperature:	0 °C … +85 °C
Pressure connection:	see table (order code)
Electrical connection:	standard plug acc. DIN EN 175301-803-A
Protection class:	IP65 acc. DIN EN 60 529
Typ I	
Output:	4 ... 20 mA
Connection:	2-wire
Power supply:	24 VDC
Zul. Power supply:	12 ... 30 VDC
Burden:	Ra[Ω]=(Uv[V]-10V) 0,02 A
Typ U	
Output:	0 ... 10 V
Connection:	3-wire
Rated voltage	24 VAC/VDC
admissible operating voltage	12 ... 30 VAC/VDC

Technical Drawing DT 1 - G1/2"



Technical Drawing DT 1 - G1/4"



Pressure transmitter DT1 (Product Group 1)

Order Code

Item-No: DT1-I/02/01

DT	1	-	I	/	0 2	/	0 1
TYPE			Output		Pressure range		Thread socket
DT	1	-	I = 4 ... 20 mA	/	01 = 0 ... 1,6 bar	/	01 = G1/4"
			U = 0 ... 10 V		02 = 0 ... 2,5 bar		02 = G1/2"
			00 = Special*		03 = 0 ... 4 bar		03 = Schrader
					04 = 0 ... 6 bar		00 = Special*
					05 = 0 ... 10 bar		
					06 = 0 ... 16 bar		
					07 = 0 ... 25 bar		
					08 = 0 ... 40 bar		
					09 = 0 ... 60 bar		
					10 = -1 ... 0 bar		
					11 = -1 ... 0,6 bar		
					12 = -1 ... 1,5 bar		
					13 = -1 ... 3 bar		
					14 = -1 ... 5 bar		
					15 = -1 ... 9 bar		
					16 = -1 ... 15 bar		
					17 = 0 ... -1 bar		
					00 = Special*		

*Sepcial models on demand

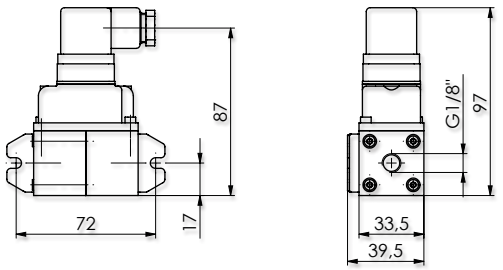
PRESSURE AND DIFFERENTIAL PRESSURE TRANSDUCER- FDE40

Application

Our FDE40 is a pressure transmitters for overpressure, vacuum and differential pressure Measurements. The transmitter of this series is suitable for Measurements of broadly neutral liquids and gases. He can be used in all areas of industrial or sanitary Measurement.

Technical Data	
Pressure ranges:	see table
Pressure media:	Largely neutral liquids and gases
Protection class:	IP65
Mounting position:	variable
Characteristic deviation:	< 1%
Electrical Connection:	3-wire
Output signal:	0-10V or 4-20mA
Power supply:	24 VAC/VDC
Power consumption:	< 1,5 W (VA)

Technical Drawing FDE40



DifferenzPressure transmitter Typ FDE40 (Product Group 2)

Order code		
Pressure chamber, stainless steel, (axial) G1/8" Power supply 24 VAC/DC Standard plug DIN EN 175 301-803-A For wall mounting		

Construction Type	Order Code	
Measuring range		
0 … 2 bar	4 5	
0 … 4 bar	0 5	
0 … 6 bar	0 6	
0 … 10 bar	0 7	

Output		
0 - 10 V DC 3-wire (Standard)	C	
4 - 20 mA 3-wire (Standard)	P	

FDE40			V	0	0	0		L	H	W

Special models available on demand

Order example: Differential pressure transmitter pressure range 0 … 4 bar and 0-10V = FDE40 05 V 0 00 C L H W

Special models available on demand.


FLOW

FLOW

Hydrodynamics/fluid mechanics is the study of the physical behaviour of gasses and fluids. It is one of the most important disciplines in the field of theoretical mechanical engineering.

TiTEC offers a flow sensor for controlling the flow of liquid media in pipes. It is used as water shortage protection in HVAC systems.

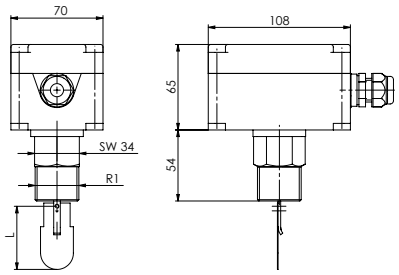
The STF1 on the other hand is an air stream monitor for measuring nonaggressive and gaseous streams. Its processor is operated by a microcontroller. The STV isavailable with both 0...10 V and 4...20 mA output. The switch point is individually adjustable for values between 0.1 and 30 m/s.

FLOW CONTROLLER FOR LIQUID MEDIA - SW1/2

Application
Device for controlling the flow of liquid media in pipes with a diameter of 1/2" to 8". Used as water shortage protection in HVAC systems. The monitor is equipped with a potential free changeover switch responsible for reliably activating an actuator.

Technical Data	
Switching values:	See table
Contacts:	Microswitch as single-pole potential-free changeover switch
Switching capacity:	16 (8) A, 24 - 250 VAC, at 24 VAC min. 150 mA
Life span:	100.000 cycles at nominal capacity
Electrical connection:	Screw clamp 1.5 mm2, cable Ø 6...9 mm
Max. pressure:	See table
Housing:	ABS, white
Cable inlet:	PG 20 x 1,5 mm
Connection Thread:	1"GAS, Brass or Stainless steel VA
Material paddle:	Stainless steel V2A / Brass
Dimensions:	See drawing
Weight:	600 g
Protection class:	IP65
Protection rating:	III
Medium temperature:	-25 °C … +120 °C
Ambient humidity:	10 … 95% RH, without Condensation
Ambient temperature:	-40 °C … +85 °C
Storage temperature:	-20 °C … +60 °C
Norms:	CE, RoHS

Technical Drawing SW1/2



Nominal value	Paddle size	Streamswitching values ON m³/h	ON m³/h	ON m³/h	ON m³/h
1"	1	0,8	2,2	1,2	2,3
1"1/4	1	0,93	2,52	1,5	2,8
1"1/2	1, 2	1,1	3,9	2,37	4,3
2"	1, 2	2,0	6,05	3,8	6,5
2"1/2	1, 2, 3	5,0	11,7	6,2	12,6
3"	1, 2, 3	10,0	30,0	8,06	36,0
4"	1, 2, 3	21,1	51,4	24,0	69,0
6"	1, 2, 3, 4	12,4	29,0	20,0	33,7
	1, 2, 3	24,0	72,0	32,7	90,0
8"	1, 2, 3, 4	23,9	83,4	34,6	96,0
	1, 2, 3	48,4	174	66,8	200

Overview (Product Group 2)

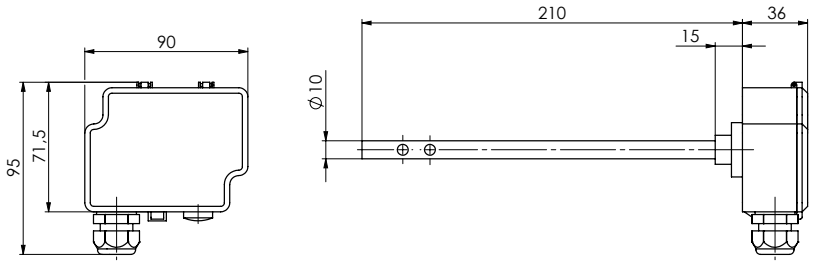
Type	Medium	Max. pressure	Material Thread.	
SW1	normal	15 bar	Brass	
SW2	aggresive	30 bar	Stainless steel	

AIR STREAM MONITOR - STF1

Application
Air flow controller based on a microcontroller for measuring nonaggressive gaseous flows in the range of 0.5 to 10/30 m/s. Available with both 0-10 V and 4-20 mA output. Additionally, a separate output signal for temperature pickup can be added.

Technical Data	
Power supply:	24 VAC/VDC
Power consumption (4...20 mA):	50mA (0...10 V) / 90mA (4...20 mA)
Output signal flow:	0 … 10 V (Lmin = 1 kOhm), linear
	4 … 20 mA (Lmax = 0,4 kOhm), linear
Output temperatur:	0 … 10 V (Lmin = 1 kOhm), linear
	4 … 20 mA (Lmax = 0,4 kOhm), linear
Measuring range:	0 ... 2 m/s , 0 ... 10 m/s , 0 ... 20 m/s
Relais output (STF1 only):	Switching voltage 250 VAC, 6A / 30VDC, 6A
	NO/NC: Contact opens or closes at flow detection
Function at flow presens:	Switching point, adjustable via potentiometer
Display (STF1 only):	45,7 x 12,7mm
Electrical connection:	Screw clamps 1,5mm²
Medium temperature:	0°C … +50 °C
Switching point:	Settable via potentiometer
Fitting length:	Manually adjustable 50-180mm
Protection class Sensor:	IP54
Measurements Housing:	90 mm x 95 mmx36 mm

Technical Drawing STF1



Overview (Product Group 1)

Type	Output flow	Output temperature	Display	
STF1	0 … 10 V / 4 … 20 mA	0 … 10 V / 4 … 20 mA	incl + Relay	
STF2	0 … 10 V / 4 … 20 mA	0 … 10 V / 4 … 20 mA	-	


MODBUS

MODBUS

Their Potty integration options into existing bus systems, makes our Modbus sensors ideal in almost all areas of application in industrial, building technology, through to private use too.

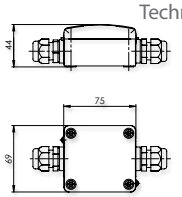
To secure this precision, functionality and user comfort at the highest level, the focus of our development is on the constant optimization and development our entire Modbus range.

TEMPERATURE

The physical size of the temperature relates to the thermodynamic balance: If two objects have the same temperature, no exchange of heat takes place between them - even if they are in direct contact with each other. This is different when the temperatures deviate. In this case, a heat exchange takes place until both objects have the same temperature. The mean value between the two starting temperatures is called equilibrium temperature and is marked with the SI unit Kelvin (K).

Overview (Product Group 2)

Technical Drawing MDG



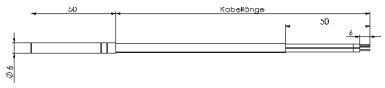
Modbus temperature measuring transducer

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65

Further information about the sensor on page 74

KBTF/MD:

Technical Drawing KBTF/MD



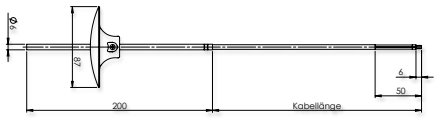
Modbus Cable/Surface temperature sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Cable sensor

Further informationsabout the sensor on page 75

KBTFL/MD

Technical Drawing KBTFL/MD



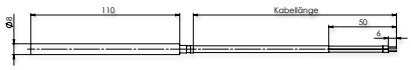
Modbus immersion temperature sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Immersion sensor

Further information about the sensor on page 76

RPF/MD:

Technical Drawing RPF/MD



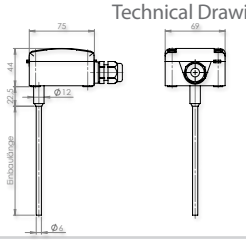
Modbus pendulum sensor indoors

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	indoor pendulum temperature sensor

Further information about the sensor on page 77

KNTF/MD:

Technical Drawing KNTF/MD



Modbus duct temperature sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Duct sensor

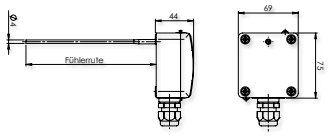
Further information about the sensor on page 78

TEMPERATURE

Overview (Product Group 2)

MWTF/MD:

Technical Drawing MWTF/MD



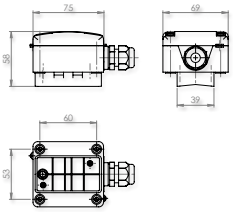
Modbus Mean value sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Mean value sensor

Further information about the sensor on page 80

ANTF1/MD:

Technical Drawing ANTF1/MD



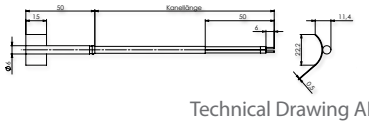
Modbus contact temperature sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	contact temperature sensor

Further information about the sensor on page 82

ANTF3VA/MD:
ANTF3MS/MD:

Technical Drawing ANTF3VA/



Technical Drawing ANT-

Modbus contact temperature sensor (cable)

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	contact temperature sensor

Further information about the sensor on page 83

OBTF/MD:

Technical Drawing OBTF/MD

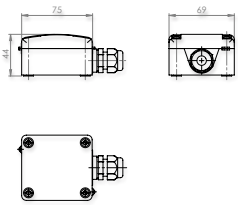
Modbus Surface temperature sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Surface temperature sensor

Further information about the sensor on page 84

AUTF/MD:

Technical Drawing AUTF/MD



Modbus Temperature sensor outdoors

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Outdoor temperature sensor

Further information about the sensor on page 85

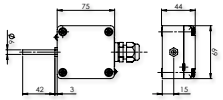
TEMPERATURE

The physical size of the temperature relates to the thermodynamic balance: If two objects have the same temperature, no exchange of heat takes place between them - even if they are in direct contact with each other. This is different when the temperatures deviate. In this case, a heat exchange takes place until both objects have the same temperature. The mean value between the two starting temperatures is called equilibrium temperature and is marked with the SI unit Kelvin (K).

Overview (Product Group 2)

AUTFext/MD:

Technical Drawing AUTFext/MD



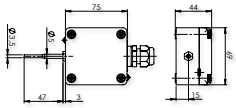
Modbus Temperature sensor outdoors (ext. Sleeve)

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Outdoor temperature sensor

Further information about the sensor on page 86

AUTFextS/MD:

Technical Drawing AUTFextS/MD



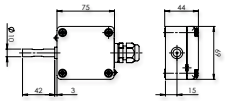
Modbus Temperature sensor outdoors (fast response)

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Outdoor temperature sensor

Further information about the sensor on page 86

AUTFext2/MD:

Technical Drawing AUTFext2/MD



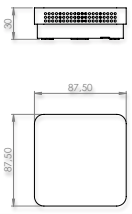
Modbus Temperature sensor outdoors (sun protection)

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Outdoor temperature sensor

Further information about the sensor on page 87

RTF3/MD:

Technical Drawing RTF3/MD



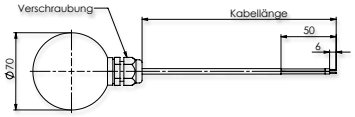
Modbus Temperature sensor indoors

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	87,5 x 87,5 x 30 mm
Housing:	ABS, Colour RAL 9010
Protection class:	IP30
Sensor:	Indoor temperature sensor

Further information about the sensor on page 88

STF/MD:

Technical Drawing STF/MD



Modbus Radiation sensor cable

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Radiation sensor

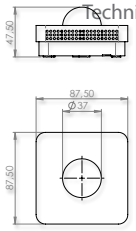
Further information about the sensor on page 89

TEMPERATURE

Overview (Product Group 2)

RSTF/MD:

Technical Drawing RSTF/MD



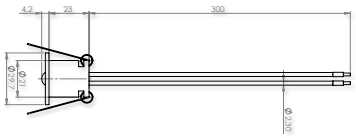
Modbus Radiation sensor indoors

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	87,5 x 87,5 x 47,5 mm
Housing:	ABS, Colour RAL 9010
Protection class:	IP30
Sensor:	Radiation temperature sensor

Further information about the sensor on page 90

DEBF/MD:

Technical Drawing DEBF/MD



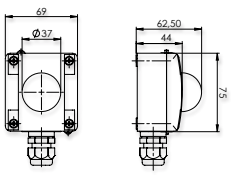
Modbus Ceiling-mounted temperature sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Ceiling-mounted temperature sensor

Further information about the sensor on page 97

ASTF/MD:

Technical Drawing ASTF/MD



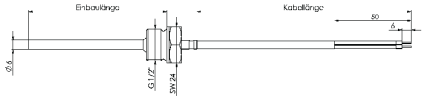
Modbus Radiation sensor outdoors

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Radiation temperature sensor

Further information about the sensor on page 91

ESF/MD:

Technical Drawing ESF/MD



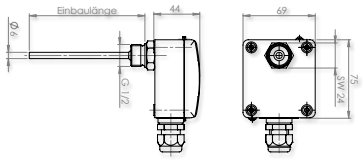
Modbus Screw-In sensor (cable)

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Screw-In sensor

Further information about the sensor on page 92

ENTF/MD:

Technical Drawing ENTF/MD



Modbus Screw-In sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Screw-In sensor

Further information about the sensor on page 93

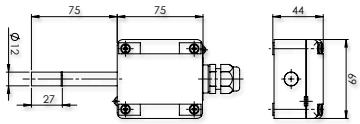
HUMIDITY

The physical term "humidity" signifies the water content. Gaseous humidity in general is termed as "Air humidity". In the context of liquid water, we are talking about "mist", "fog" or "vapor". TiTEC's humidity measuring solutions feature digital sensors and a large measuring range. At the customer's option, our devices are able to display relative humidity, absolute humidity and the dew point.

Overview (Product Group 2)

ARFT/R-MD/S:

Technical Drawing ARFT/R-MD/S



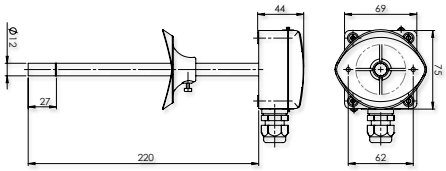
Modbus Humidity sensor outdoors

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	AußenHumiditysensor

Further information about the sensor on page 103

KFFT/R-MD/S:

Technical Drawing KFFT/R-MD/S



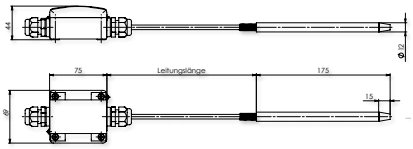
Modbus Duct humidity sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Duct humidity sensor

Further information about the sensor on page 104

ARFT/R-MD/HT:

Technical Drawing ARFT/R-MD/HT



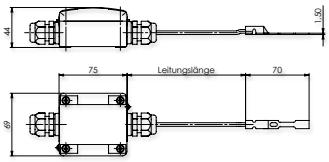
Modbus High temperature/humidity sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	High temperature/humidity sensor

Further information about the sensor on page 109

TPWext-MD:

Technical Drawing TPWext-MD



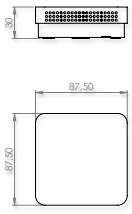
Modbus Dew point monitor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Dew point sensor

Further information about the sensor on page 110

RFFT/R-MD/S:

Technical Drawing RFFT/R-MD/S



Modbus Humidity sensor indoors

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	87,5 x 87,5 x 30 mm
Housing:	ABS, Colour RAL 9010
Protection class:	IP30
Sensor:	Indoor humidity sensor

Further information about the sensor on page 102

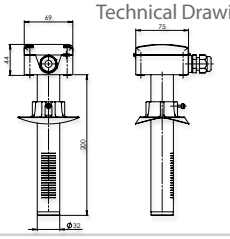
CO2 + AIR QUALITY

The term "air quality" describes the composition of ambient air with respect to pollution. The respective threshold and guide values are defined by laws and regulations. Air monitoring is carried out with the help of emission measuring networks. As a rule, the respective measuring stations function independent of each other. Modern systems transfer the measured values to host computers fully automatic.

Overview (Product Group 2)

KALQ-MD

Technical Drawing KALQ-MD



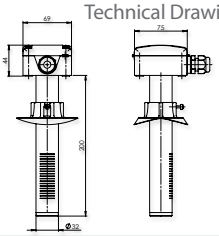
Modbus Duct sensor carbon dioxide/temperture

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Duct

Further information about the sensor on page 121

KACO2-MD:

Technical Drawing KACO2-MD



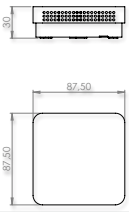
Modbus Duct air quality sensor

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Duct air quality sensor

Further information about the sensor on page 123

RALQ-MD:

Technical Drawing RALQ-MD



Modbus Carbon dioxide sensor indoors

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	87,5 x 87,5 x 30 mm
Housing:	ABS, Colour RAL 9010
Protection class:	IP30
Sensor:	Carbon dioxide sensor

Further information about the sensor on page 119

RACO2-MD:

Technical Drawing RACO2-MD

Modbus air quality sensor indoors

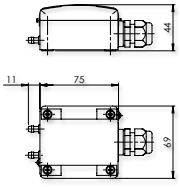
Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	87,5 x 87,5 x 30 mm
Housing:	ABS, Colour RAL 9010
Protection class:	IP30
Sensor:	Air quality sensor

Further information about the sensor on page 122

DIFFERENTIAL PRESSURE

DDM/MD:

Technical Drawing DDMU/MD



Modbus Differential pressure transmitter

Protocol:	Modbus (ASCII/RTU), RS485
Power supply:	12-34 VAC/VDC
:Dimensions:	75 x 69 x 44 mm
Housing:	PA6, Colour RAL 9010
Protection class:	IP65
Sensor:	Differential pressure sensor

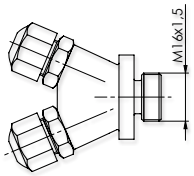
Further information about the sensor on page 137

ACCESSORIES

Overview (Product Group 2)

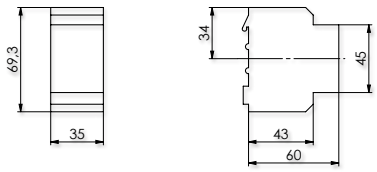
Z-240:

Technical Drawing Z-240



MDM-DI10:

Technical Drawing MDM-DI10

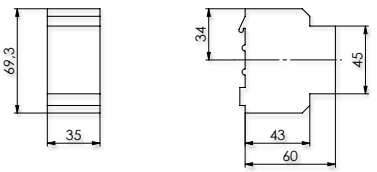


Modbus Modul with digital Inputs

Protocol:	Modbus RTU
Range of adresses:	00 bis 99
Transfer rate:	1200 bis 115200 Bit/s
Bus interface:	RS485 2-wired bus, potential compensation
Digital inputs:	10
Input voltage:	30 VAC/DC
High-signal detection:	<7 VAC/DC
Switching voltage max.:	250 VAC

MDM-AOP4:

Technical Drawing MDM-AOP4

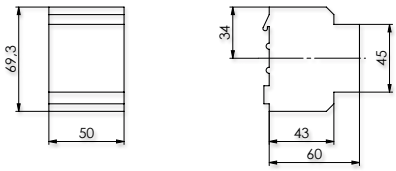


Modbus Modul with analog outputs

Protocol:	Modbus RTU
Range of adresses:	00 bis 99
Transfer rate:	1200 bis 115200 Bit/s
Bus interface:	RS485 2-wired bus, potential compensation
Analog outputs:	4
Output voltage	4 x 0 bis 10 VDC
Resolution:	0,625 mV / Digit
Gap:	100 mV

MDM-NG4-HS:

Technical Drawing MDM-NG4-HS

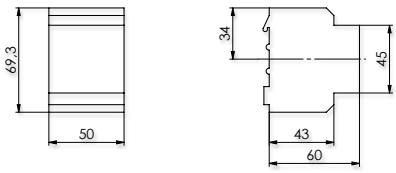


Power supply unit

Suitable for I/O components:	LON (LF), BACnet (BMT), Modbus (MR)
Input voltage:	110-240 VAC
Cutout:	intern T 1,0 AL/250V, solder cutout
Output voltage:	+24 VDC (SELV)
Output current max.:	700 mA
Output behaviour:	16 W
Relay accuracy:	+/- 3%, Tu = 20°C
Output:	Safety extra low voltage acc. EN 60950
Protection rating:	2

MDM-AI8:

Technical Drawing MDM-AI8

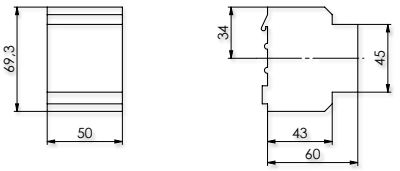


Modbus Modul with analog Inputs

Protocol:	Modbus RTU
Power supply:	20 bis 28 VAC/DC
Range of adresses:	00 bis 99
Transfer rate:	1200 bis 115200 Blt/s
Bus interface:	RS485 2-wired bus, potential compensation
Analog inputs:	8
Input voltage:	0 bis 10 VDC
Resolution:	15 Bit
Range of resistance:	40 Ohm...4 MOhm

MDM-DIO4/2:

Technical Drawing MDM-DIO4/2



Modbus Modul with digital Inputs/Outputs

Protocol:	Modbus RTU
Power supply:	20 bis 28 VAC/DC
Range of adresses:	00 bis 99
Transfer rate:	1200 bis 115200 Blt/s
Bus interface:	RS485 2-wired bus, potential compensation
Digital inputs:	4
Input voltage:	30 VAC/DC
Output contacts:	2 Switcher
Switching voltage max.:	250 VAC

METEOROLOGY

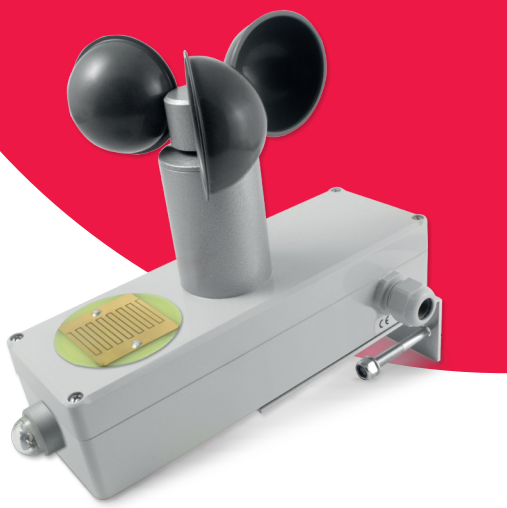
WEATHER STATIONS, WIND SENSOR AND WIND DIRECTION SENSOR

Especially for the work on exterior surfaces, the constant monitoring of the thermal environment is a supporting role which has to be planned for mission objectives and be taken into reliable environmental factors.

Due to the constant use among some extreme climatic conditions, and in extreme cases significant impact already low thermal changes, we attach great importance to precision and durability of our products.•

- Wind speed
- Wind Direction
- sunlight
- Rain

WEATHER STATION - WST



Application
Our weather stations can optionally be configured with different measurement ranges like wind, rain and sun. They are available with two different outputs 0-10V and 4-20mA and can thus be connected to all standard display and control systems.

Technical Data	
Power supply:	24 AC/DC or 230 VAC
Measuring range:	0...35 m/s or 0...100000 lux
Start speed:	Ca. 1 m/s
Max. wind load	50 m/s
Output wind:	0...10V or 4...20mA
Output sun:	0...10V or 4...20mA
Output rain:	Floating changeover
Delay switch on:	Rain: instant
Delay switch off:	Rain: after drying
Weight:	1,5 kg
Height:	190mm
Mast holder:	max. 50mm Diameter
Anemometer diameter:	160mm
Colour:	White/grey
Protection class:	IP65

Overview (Product Group 2)

Type	Output	Power supply	Wind	Rain	Sun	
WST/24-U-W/R/S	0-10 V	24 AC/DC	Yes	Yes	Yes	
WST/230-U-W/R/S	0-10 V	230 VAC	Yes	Yes	Yes	
WST/24-I-W/R/S	4-20mA	24 AC/DC	Yes	Yes	Yes	
WST/230-I-W/R/S	4-20 mA	230 VAC	Yes	Yes	Yes	
WST/24-U-W/R	0-10 V	24 AC/DC	Yes	Yes	No	
WST/230-U-W/R	0-10 V	230 VAC	Yes	Yes	No	
WST/24-I-W/R	4-20mA	24 AC/DC	Yes	Yes	No	
WST/230-I-W/R	4-20 mA	230 VAC	Yes	Yes	No	
WST/24-U-W/S	0-10 V	24 AC/DC	Yes	No	Yes	
WST/230-U-W/S	0-10 V	230 VAC	Yes	No	Yes	
WST/24-I-W/S	4-20mA	24 AC/DC	Yes	No	Yes	
WST/230-I-W/S	4-20 mA	230 VAC	Yes	No	Yes	

Order example: Weather station Wind, Rain and Sun with Output signal 0...10 V and 230V = WST/230-U-W/R/S
Special models available on demand.

WIND SENSOR - WM1

Application
The wind transmitter is designed in order to detect the wind speed, the evaluation system is integrated in the wind sensor itself. Our wind transmitters are used in home automation and building automation. They are used for actuators in dependence on the wind speed in order to enable or disable them. Through the standardized output signal of 0-10V or 4-20mA can easily be attached to existing controls and schemes.

Technical Data	
Power supply:	24 AC/DC or 230 VAC
Measuring range:	0...35 m/s
Start speed:	Ca. 1 m/s
Max. wind load	50 m/s
Output:	0-10V or 4-20mA
Height:	190mm
Mast holder:	max. 50mm Diameter
Anemometer diameter:	160mm
Protection class:	IP65

Overview (Product Group 2)

Typ	Output	Power supply	
WM1/24-U	0-10 V	24 AC/DC	
WM1/230-U	0-10 V	230 VAC	
WM1/24-I	4-20mA	24 AC/DC	
WM1/230-I	4-20 mA	230 VAC	

Order example: Wind sensor with Output signal 0-10 V and 24V power supply = WM1/24-U
Special models available on demand.

WIND DIRECTION SENSOR - WM2

Application

The wind direction sensor used to detect the wind direction, the evaluation system is integrated in the wind sensor. It is used a sensor in home automation and building automation. They are used for actuators in dependence on the wind direction to use. Through the standardized output signal of 0-10V or 4-20mA, you can easily connect them to existing controls and regulations.

Technical Data	
Power supply:	24 AC/DC or 230 VAC
Start speed:	Ca. 1 m/s
Max. wind load	50 m/s
Output:	0-10V or 4-20mA
Height:	220mm
Weather vane:	350mm
Mast holder:	Bis 50mm Diameter
Protection class:	IP65

Overview (Product Group 2)

Type	Output	Power supply	
WM2/24-U	0-10 V	24 AC/DC	
WM2/230-U	0-10 V	230 VAC	
WM2/24-I	4-20mA	24 AC/DC	
WM2/230-I	4-20 mA	230 VAC	

Order example: Wind direction sensor with Output signal 0...10 V with Power supply 230V = WM2/230-U

Special models available on demand.

COMBINED WIND SENSOR AND WIND DIRECTION SENSOR - WM3

Application

The combined wind transmitter / wind direction sensor is used to detect the wind direction and the wind speed in one combination device, the evaluation system is integrated in the sensor. Our wind transmitters are made exclusively in Germany and therefore deserve the predicate "Made in Germany".

Technical Data	
Power supply:	24 AC/DC or 230 VAC
Measuring range:	0...360° and 0...35 m/s
Start speed:	Ca. 1 m/s
Max. wind load	50 m/s
Output:	0-10V or 4-20mA
Height:	400mm
Weather vane:	350mm
Mast holder:	max. 50mm Diameter
Anemometer diameter:	160mm
Protection class:	IP65

Overview (Product Group 2)

Type	Output	Power supply	
WM3/24-U	0-10 V	24 AC/DC	
WM3/230-U	0-10 V	230 VAC	
WM3/24-I	4-20mA	24 AC/DC	
WM3/230-I	4-20 mA	230 VAC	

Order example: Combined wind and wind direction sensor with Output signal 0...10 V and Power supply 230V = WM3/230-U

Special models available on demand.

THYRISTOR CONTROLLER

THYRISTOR CONTROLLER - SINGLE-PHASE – THREE-PHASE

A thyristor controller is used for controlling the power consumption of electrical components. The controllers are mainly applied in places where greater ohmic or inductive loads need to be controlled.

The modular, compact design and the activation with a steady control signal make this power controller the perfect actuator for industrial power control applications.
The power element of the Thyristor Controller consists of two antiparallel connected thyristors, the isolated cooling element and the control logics.



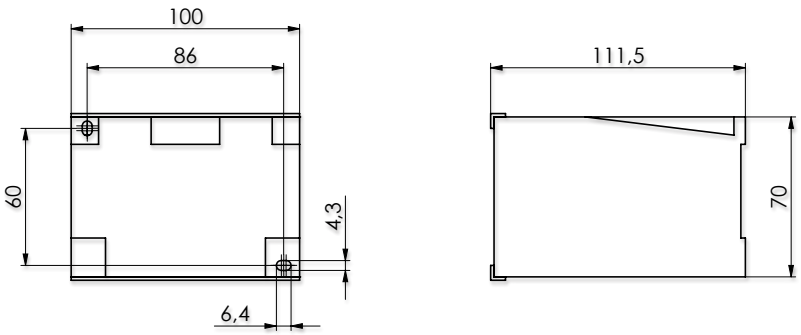

THYRISTOR CONTROLLER SINGLE-PHASE 60-160 A (STEINER) - TLS3XXX1PH

Application

The Thyristor Controller is mainly used in areas where larger ohmic and inductive loads need to be kept ander control. The modular, compact design and the activation with a steady control signal make this power controller the perfect actuator for industrial power control applications. The power element of the Thyristor Controller consists of two antiparallel connected thyristors,the isolated cooling element and the control logics.

Technical Data	
Rated power supply:	230 VAC
Rated frequency:	48 … 62 Hz
Rotary field:	self-synchronising
Loads:	Ohmic and inductive
Test voltage:	acc. VDE 0160, Tab. 6 / DIN EN 50178 Tab. 18
Protection class:	Screw clamps: IP20
Climatic resistance:	Humidity class FDIN 40040
Ambient temperature:	In process: 0 °C … +55 °C
Mounting:	Clickable onto DIN-Railsysteme (DIN 46277-3; 35 x 7,5 mm) or screw-on-able onto mounting board
Display	In process: LED „green“ Modulation 100%: LED „green“
Signal contact:	Modulation 100% 250 VAC, 2 A; 24 VDC , 3 A
CE-mark:	Acc. europeen extra-low voltage agreement 73 / 23 / EEC and EMV Directive 89 / 336 EWG for industrial sector.
Norms:	VDE 0160, EN 60204, IEC 947-4-2
Inputs:	0 … 10 V, 0 … 20 mA oder Potentiometer (2,5 … 10 kOhm)

Technical Drawing TLSxxx1ph



Overview (Product Group 2)

Type	
TLS3 60A 1ph	
TLS3 60A 1ph / SP	
TLS3 75A 1ph	
TLS3 75A 1ph / SP	
TLS3 90A 1ph	
TLS3 90A 1ph / SP	
TLS3 120A 1ph	
TLS3 120A 1ph / SP	
TLS3 160A 1ph	
TLS3 160A 1ph / SP	

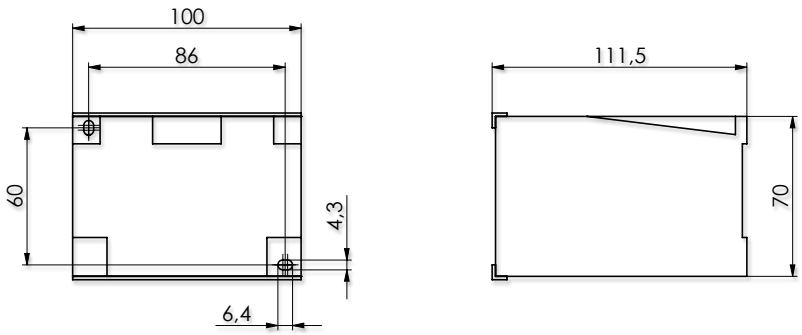
THYRISTOR CONTROLLER SINGLE-PHASE 2-12 A (STEINER) - TLS1XXX1PH

Application

The Thyristor Controller is mainly used in areas where larger ohmic and inductive loads need to be kept ander control. The modular, compact design and the activation with a steady control signal make this power controller the perfect actuator for industrial power control applications. The power element of the Thyristor Controller consists of two antiparallel connected thyristors, the isolated cooling element and the control logics

Technical Data	
Rated power supply:	230 VAC
Rated frequency:	48 … 62 Hz
Rotary field:	self-synchronising
Loads:	Ohmic and inductive
Test voltage:	acc. VDE 0160, Tab. 6 / DIN EN 50178 Tab. 18
Protection class:	Screw clamps: IP20
Climatic resistance:	Humidity class F DIN 40040
Ambient temperature:	In process: 0 °C … +45 °C
Mounting:	Clickable onto DIN-Railsystems (DIN 46277-3; 35 x 7,5 mm)
Display	In process: LED „green“ Modulation 100%: LED „green“
Signal contact:	Modulation 100% 250 VAC, 2 A; 24 VDC, 3 A
CE-mark:	Acc. europeen extra-low voltage agreement 73 / 23 / EEC and EMV Directive 89 / 336 EW G for industrial sector.
Norms:	VDE 0160, EN 60204, IEC 947-4-2
Inputs:	0 … 10 V, 0 … 20 mA or potentiometer (2,5 … 10 kOhm)

Technical Drawing TLSxxx1ph



Overview (Product Group 2)

Type	
TLS1 02A 1ph	
TLS1 02A 1ph / SP	
TLS1 04A 1ph	
TLS1 04A 1ph / SP	
TLS1 06A 1ph	
TLS1 06A 1ph / SP	
TLS1 08A 1ph	
TLS1 08A 1ph / SP	
TLS1 10A 1ph	
TLS1 10A 1ph / SP	
TLS1 12A 1ph	
TLS1 12A 1ph / SP	

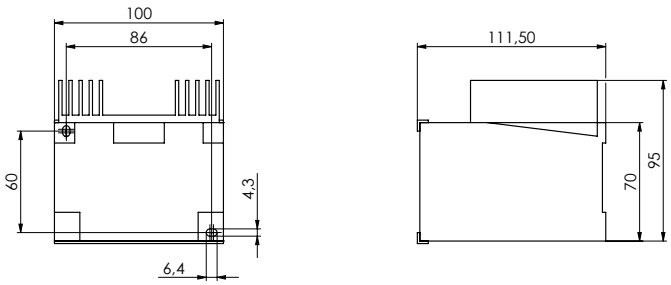
THYRISTOR CONTROLLER THREE-PHASE 60-160 A (STEINER) - TLS3XXX3PH

Application

The Thyristor Controller is mainly used in areas where larger ohmic and inductive loads need to be kept ander control. The modular, compact design and the activation with a steady control signal make this power controller the perfect actuator for industrial power control applications. The power element of the Thyristor Controller consists of two antiparallel connected thyristors, the isolated cooling element and the control logics.

Technical Data	
Rated power supply:	3x 400 VAC (Line voltage)
Rated frequency:	45 … 65 Hz
Rotary field:	self-synchronising
Loads:	Ohmic and inductive
Test voltage:	acc. VDE 0160, Tab. 6 / DIN EN 50178 Tab. 18
Protection class:	Screw clamps: IP20
Climatic resistance:	Humidity class FDIN 40040
Ambient temperature:	In process: 0 °C … +55 °C
Mounting:	Clickable on DIN-Railsystems (DIN 46277-3; 35 x 7,5 mm) or screw-on-able onto mounting board
Display	In process: LED „green“ Modulation 100%: LED „green“
Signal contact:	Modulation 100% 250 VAC, 2 A ; 24 VDC, 3 A
CE-mark:	Acc. europeen extra-low voltage agreement 73 / 23 / EEC and EMV Directive 89 / 336 EWG for industrial sector.
Norms:	VDE 0160, EN 60204, IEC 947-4-2
Inputs:	0 … 10 V, 0 … 20 mA or Potentiometer (2,5 … 10 kOhm)

Technical Drawing TLS3xxx3ph



Overview (Product Group 2)

Type	
TLS3 60A 3ph	
TLS3 60A 3ph / SP	
TLS3 75A 3ph	
TLS3 75A 3ph / SP	
TLS3 90A 3ph	
TLS3 90A 3ph / SP	
TLS3 120A 3ph	
TLS3 120A 3ph / SP	
TLS3 160A 3ph	
TLS3 160A 3ph / SP	

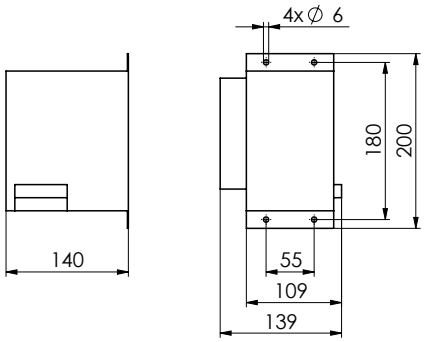
THYRISTOR CONTROLLER THREE-PHASE - 2-10 A (STEINER) - TLS1XXX3PH

Application

The Thyristor Controller is mainly used in areas where larger ohmic and inductive loads need to be kept ander control. The modular, compact design and the activation with a steady control signal make this power controller the perfect actuator for industrial power control applications. The power element of the Thyristor Controller consists of two antiparallel connected thyristors, the isolated cooling element and the control logics.

Technical Data	
Rated power supply:	3x 400 VAC (Line voltage)
Rated frequency:	48 … 62 Hz
Rotary field:	self-synchronising
Loads:	Ohmic and inductive
Test voltage:	acc. VDE 0160, Tab. 6 / DIN EN 50178 Tab. 18
Protection class:	Screw clamps: IP20
Climatic resistance:	Humidity class FDIN 40040
Ambient temperature:	In process: 0 °C … +45 °C
Mounting:	Clickable on DIN-Railsysteme (DIN 46277-3; 35 x 7,5 mm) or screw-on-able onto mounting board
Display	In process: LED „green“ Modulation 100%: LED „green“
Signal contact:	Modulation 100% 250 VAC, 2 A; 24 V DC, 3 A
CE-mark:	Acc. europeen extra-low voltage agreement 73 / 23 / EEC and EMV Directive 89 / 336 EWG for industrial sector.
Norms:	VDE 0160, EN 60204, IEC 947-4-2
Inputs:	0 … 10 V, 0 … 20 mA or Potentiometer (2,5 … 10 kOhm)

Technical Drawing TLS1xxx3ph



Overview (Product Group 2)

Type	
TLS1 02A 3ph	
TLS1 02A 3ph / SP	
TLS1 04A 3ph	
TLS1 04A 3ph / SP	
TLS1 06A 3ph	
TLS1 06A 3ph / SP	
TLS1 08A 3ph	
TLS1 08A 3ph / SP	
TLS1 10A 3ph	
TLS1 10A 3ph / SP	

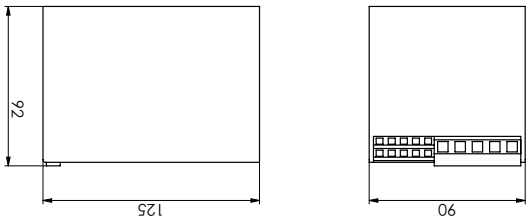
THYRISTOR CONTROLLER SINGLE-PHASE 15-50 A (TYCO) - TLSXXX1PH

Application

The Thyristor Controller is mainly used in areas where larger ohmic and inductive loads need to be kept ander control. The modular, compact design and the activation with a steady control signal make this power controller the perfect actuator for industrial power control applications. The power element of the Thyristor Controller consists of two antiparallel connected thyristors, the isolated cooling element and the control logics.

Technical Data	
Rated voltage:	230 VAC
Frequency:	45 ... 65 Hz, self synchronising
Inputs:	0 ...10 V 0 ... 20 mA Connection potentiometer: 2,5...10 kOhms input impedance: 500 Ohmss, 50 kOhms
Protection:	Thermal cutout with LED display: „Fault“
LED-Display:	Auxiliary voltage, start, 100% ULoad, Fault
Setting options:	Smooth start: 0 … 10 s, at PWM selection: 0 … 5 s
Outputs:	Error message: Clamp 6, 7 closed, burden 2 A, 230 V AC, AC1
Power connection:	• L1, L2 Input voltage • T1, T2 Output voltage
Control:	Phase control (optional: pulse group process)
Power dissipation:	1,1W per ampere
Operating temperature:	0°C...50°C
Protection Class:	IP40
Measurements:	92 x 125x 90 mm
Mounting:	Clickable on DIN-Railsystems (DIN 46277-3; 35 x 7,5 mm) or screw-on-able onto mounting board
Norms:	Acc. europeen extra-low voltage agreement 73 / 23 / EEC and EMV Directive 89 / 336 EWG for industrial sector

Technical Drawing TLSxxx1ph



Overview (Product Group 2)

Type	
TLS2 15A 1ph	
TLS2 15A 1ph / SP	
TLS2 25A 1ph	
TLS2 25A 1ph / SP	
TLS2 35A 1ph	
TLS2 35A 1ph / SP	
TLS2 50A 1ph	
TLS2 50A 1ph / SP	

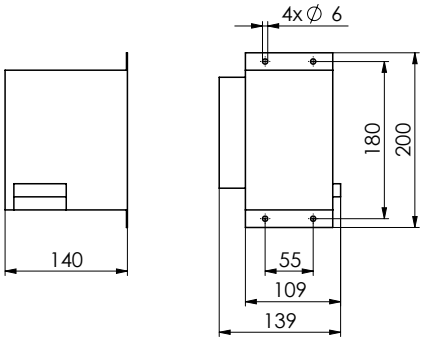
THYRISTOR CONTROLLER THREE-PHASE 15-50 A (TYCO) - TLS1XXX3PH

Application

The Thyristor Controller is mainly used in areas where larger ohmic and inductive loads need to be kept ander control. The modular, compact design and the activation with a steady control signal make this power controller the perfect actuator for industrial power control applications. The power element of the Thyristor Controller consists of two antiparallel connected thyristors, the isolated cooling element and the control logics.

Technical Data	
Voltage load:	400 VAC
Frequency:	45...65 Hz, Self synchronising
Inputs:	0...10 V; 0...20 mA; Connection potentiometer: 2,5 ... 10 kOhms 10 ... 0 V Inverted input (Option); 5 V / 5 ... 10 kHz PWM Input
Input impedance:	Switchable input impedance: 500 Ohms, 50 kOhm
Protection:	Phase- and device temperature monitoring: fault: red LED and shutdown
LED-Display:	In process, Start, Run, 100% ULoad, Fault, Modulation (Level)
Einstellmöglichkeiten:	Smooth start: 0 … 10 Sek, at PWM selection 0 … 5 Sek
Outputs:	Error message: Kl. 13,14 closed; Load: 2 A, 230 VAC, AC1; S1-Relay output: Kl. 19,20 closed; Load: 2 A, 230 VAC, AC1; S2-Relay output: Kl. 16,17 closed.; Load: 2 A, 230 VAC, AC1;
Power connection:	L1, L2, L3 Input voltage; T1, T2. T3 Output voltage
Control:	Phase control (Optional: pulse group process)
Power dissipation:	1,1 W per ampere
Operating temperature:	0 °C … +50 °C
Protection class:	IP40
Installation:	vertical, power connection downside
Measurements:	139 x 200 x 140 mm
Mounting:	Screwable in switchboard
CE-mark:	Acc. europeen extra-low voltage agreement 73 / 23 / EEC und EMV Richtlinie 89 / 336 EWG für Industriebereich

Technical Drawing TLS1xxx3ph



Overview (Product Group 2)

Type	
TLS2 15A 3ph	
TLS2 15A 3ph / SP	
TLS2 25A 3ph	
TLS2 25A 3ph / SP	
TLS2 35A 3ph	
TLS2 35A 3h / SP	
TLS2 50A 3ph	
TLS2 50A 3ph / SP	

General information

For reasons of clarity, you will find a selection of standard configurations for our products in this catalogue. However, we are happy to discuss any deviating customer-specific demands in order to find the perfect solution to your measuring task.

Order Information
We accept orders in written form, via fax,telephone or E-mail. When placing an order, please submit your desired item(s) including the type description,quantity and - in certain cases - the desired date of delivery. Orders concerning special and extraordinary constructions must be submitted together with the respective technical specifications.

Delivery
The standard range of products is constantly available ex works if ordered in subsets. We reserve the right of prior sale. For large or special orders, the allocation of the date of delivery is carried out according to prior agreement. We reserve the right to make partial deliveries. In case of any unforeseen, unusual or inevitable occurrences, meaning natural desasters, strikes, difficulties in acquiring materials etc., we reserve the right to withdraw from the contract.

Shipping Conditions
Delivery and passing of the risk takes place ex works. The items will be shipped via a parcel service or a forwarding agency if the customer wishes so. In individual cases, the order can be delivered free to your doorstep. Additional costs for express deliveries will be calculated separately.The customer is obliged to check the shipment for missing items/defects etc. after having received the goods.

Prices/Range of Products
All prices in the catalogue are list prices stated in € plus value added tax.The costs for delivery and packaging are added separately to the bill. Our price offers are non-binding and subject to change at all time. We shall not be obliged to deliver any items before the order has been confirmed.

Payment Conditions
Any payments have to be made within 14 days. We reserve the right to charge a minimum order surcharge of 20 Euros for any orders that do not
exceed a net value of 100 Euros.

Guarantee
We offer a 3-year warranty for all products from the range of temperature and pressure measurement marked with the warranty logo. The warranty only includes the flawlessness of the items for a three year duration period counting from the date of shipment/ date of collection (Condition and durability warranty). In a warranty case, the customer is entitled to request a new delivery of a flawless item at the expense of TiTEC. However, the customer himself remains responsible for the appropriate use with regards to the intended application purpose.

Resistance characeristics (passive sensors)

Temp °C	Pt100 Ohm	Pt1000 Ohm	Ni1000 Ohm	Ni1000 TK5000 Ohm	NTC 1 kOhm	NTC 1,8 kOhm	NTC 3 kOhm	NTC 5 kOhm
-50,00	80,31	803,10	743,00	790,88	32886,00		200338,00	
-40,00	84,27	842,70	791,00	830,83	18641,00	40374,60	100701,00	166555,11
-30,00	88,22	882,20	842,00	871,69	10961,00	22905,50	53005,00	87897,04
-20,00	92,16	921,60	893,00	913,48	6662,00	13476,90	29092,00	48322,75
-10,00	96,09	960,90	946,00	956,24	4175,00	8197,80	16589,00	27584,38
0,00	100,00	1000,00	1000,00	1000,00	2961,00	5140,90	9795,20	16300,00
10,00	103,90	1039,00	1056,00	1044,79	1781,00	3315,20	5971,12	9942,85
20,00	107,79	1077,90	1112,00	1090,65	1205,00	2193,30	3748,10	6244,88
25,00	109,74	1097,40	1141,00	1113,99	1000,00	1800,00	3000,00	5000,00
30,00	111,67	1116,70	1171,00	1137,61	834,20	1485,60	2416,80	4029,18
40,00	115,54	1155,40	1230,00	1185,71	589,20	1028,30	1597,50	2664,83
50,00	119,40	1194,00	1291,00	1234,97	424,00	726,10	1080,30	1803,23
60,00	123,24	1232,40	1353,00	1285,44	310,40	522,30	746,12	1246,23
70,00	127,07	1270,00	1417,00	1337,14	231,00	382,20	525,49	878,27
80,00	130,89	1308,90	1483,00	1390,12	174,50	284,10	376,85	630,25
90,00	134,70	1347,00	1549,00	1444,39	133,60	214,30	274,83	459,92
100,00	138,50	1385,00	1618,00	1500,00	103,70	163,80	203,59	340,89
110,00	142,29	1422,00	1688,00	1556,98	81,40	126,90	153,03	256,35
120,00	146,06	1460,60	1760,00	1615,36	64,70	99,40	116,58	195,40
130,00	149,82	1498,20	1883,00	1675,18	51,90		89,95	150,83
140,00	153,58	1535,80	1909,00	1736,47	42,10		70,22	117,80
150,00	157,31	1573,10	1987,00	1799,26	34,40		55,44	93,02

Temp °C	NTC 10 kOhm	NTC 15 kOhm	NTC 20 kOhm	KTY81-210 Ohm	KTY11-6 Ohm	KTY81-110 Ohm	KTY81-121 Ohm	LM235Z mV
-50,00	667,83	454,91		1068,65	1035,91	515,00	510,00	2232,00
-40,00	335,67	245,09	804,17	1158,95	1139,27	567,00	562,00	2332,00
-30,00	176,68	137,30	412,79	1269,25	1250,39	624,00	617,00	2432,00
-20,00	96,97	79,73	220,73	1385,15	1396,25	684,00	677,00	2532,00
-10,00	55,30	47,84	122,44	1508,65	1495,86	747,00	740,00	2632,00
0,00	32,65	29,59	70,44	1639,60	1630,21	815,00	807,00	2732,00
10,00	19,90	18,82	41,54	1778,10	1772,32	886,00	877,00	2832,00
20,00	12,49	12,27	25,34	1924,15	1922,17	961,00	951,00	2932,00
25,00	10,00	10,00	20,00	2000,00	2000,00	1000,00	990,00	2982,00
30,00	8,06	8,19	15,89	2077,80	2079,77	1040,00	1029,00	3032,00
40,00	5,32	5,59	10,21	2238,90	2245,17	1122,00	1111,00	3132,00
50,00	3,60	3,89	6,72	2407,60	2418,21	1209,00	1196,00	3232,00
60,00	2,49	2,76	4,52	2583,80	2599,06	1299,00	1286,00	3332,00
70,00	1,75	1,99	3,10	2767,50	2787,65	1392,00	1378,00	3432,00
80,00	1,26	1,46	2,17	2958,80	2983,99	1490,00	1475,00	3532,00
90,00	0,92	1,08	1,54	3152,50	3188,08	1591,00	1575,00	3632,00
100,00	0,68	0,82	1,11	3363,90	3399,91	1696,00	1679,00	3732,00
110,00	0,51	0,62	0,82	3577,75	3619,50	1805,00	1786,00	3832,00
120,00	0,39	0,48	0,61	3799,10	3846,83	1915,00	1896,00	3932,00
130,00	0,30	0,38	0,46	4028,05	4081,91	2023,00	2003,00	4032,00
140,00	0,23	0,30	0,35	4188,10	4324,74	2124,00	2103,00	4132,00
150,00	0,18	0,24	0,27	4397,70	4575,31	2211,00	2189,00	4232,00