

For differential pressure detection in liquid mediums of the air-conditioning, heating and water technique. Also suitable for light aggressive liquids.



# Types available

Type code	Туре	Description
EXT-TN-1072112	PPE1.EDa	420mA, 00.5bar
EXT-TN-1071993	PPE1.ADa	420mA, 01bar
EXT-TN-1072006	PPE1.BDa	420mA, 02.5bar
EXT-TN-1066845	PPE1.CDa	420mA, 04bar
EXT-TN-1066852	PPE1.DDa	420mA, 06bar
EXT-TN-1072129	PPE1.EAa	010V, 00.5bar
EXT-TN-1072037	PPE1.AAa	010V, 01bar
EXT-TN-1072044	PPE1.BAa	010V, 02.5bar
EXT-TN-1072051	PPE1.CAa	010V, 04bar
EXT-TN-1072068	PPE1.DAa	010V, 06bar

# **Technical data**

Standards	CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> <li>2001/95/EG Product safety</li> </ul>
	EN conformity	- EN61326-1 (2006) Electrical equipment for measurement, control and laboratory use EMC requirements - EN61326-2-3 Particular requirements test configuration, operational conditions and performance criteria for transducer with integrated or remote signal conditioning - EN61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use
General data	Material contacting the medium	Ceramic / stainless steel Al2O3/1.4305
	Sealing material	EPDM
	Measuring range	Depending on the sensor used
	Pressure type	Differential pressure
	Static pressure	21bar
	Max. Pressure Difference	200% measuring range
	Bursting Pressure	300% measuring range
	Dynamic response	Suitable for static and dynamic measurements
		for response time <10ms
	Accuracy	Typical ±1% in the temperature range -575°C
	Electrical connector	Angle plug according to DIN 43650
		construction A
	Pressure connector	Inside thread G1/4"
	Installation arrangement	Unrestricted
	Enclosure	- Bottom part : stainless steel 1.4305
		<ul> <li>Top cover : aluminium pressure die casting</li> </ul>
	Protection	IP65 according to EN60529
	Ambient temperature	-1050°C
	Media temperature	-1080°C
	Transport	-2050°C / max. 85% RH, non-condensing
	Weight	510g
Type PPE1.xDa	Power supply	DC 15-24V(±10%) (2-wire)
	Power consumption	Max. 0.5W
	Output	420mA, max. load 900Ω / DC 24V
Type PPE1.xAa	Power supply	DC 15-24V(±10%) or AC 24V(±10%) (3-wire)
••	Power consumption	Typical 0.37W / 0.9VA
	Output	010V, min. load 2kΩ



# Security advice /

The installation and assembly of electrical equipment may only be performed by an authorised and skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

# Mounting advice

- The device is designed for assembly on smooth walls or mounting plates.
- For connecting the device, the process lines must be unpressurised.
- The device has to be secured against pressure surges by appropriate measures.
- Note the suitability of the device for the medium to be measured.
- The device is designed for pipe mounting.
- Note the maximum pressures
- To avoid the occurrence of interfering dead times, the pressure sensing leads shall be as small as possible and shall be laid without any sharp bends.
- With pulsating pressures on the system, function interferences of the device can be caused. As a protection, the installation of attenuating elements in the pressurised connection line is recommended.

#### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage (±0.2V).

When switching the supply voltage on/off, power surges must be avoided.

#### Installation

A prerequisite for the operation is a proper installation of all electrical supply, control and sensing leads as well as the pressurised connection

Before installing the device, the leak tightness of the pressurised connection lines must be inspected.

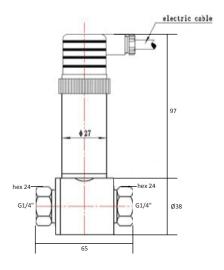
Pressurised sensing leads to be connected:

- +: higher pressure
- -: lower pressure

#### **Terminal connection plan**









Condensation detector as protection device against dew permeation on cooling ceilings. For locking on to control and display systems, in order to interrupt the cooling water flow. The device includes sensor and electronics, status LED and relay contact.

The integrated measuring element detects dew of the basic sensor plate. The plate of the sensor fits close to the medium and transfers cold to the measuring element.



## Types available

Type code	Туре	Description
EXT-TN-1071351	WK01 24V	Condensation monitor, DC or AC 24V
EXT-TN-1066746	WK01ext 24V	Condensation monitor, DC or AC 24V, with remote sensor (wire length 2m)

# **Technical data**

Standards	CE conformity	- 2004/108/EG Electromagnetic compatibility - 2001/95/EG Product safety
	EN conformity	- EN60730-1:2002 EMC - EN60730-1:2002 Product safety
General data	Enclosure	Polyamide, Colour white
	Protection	IP65 according to EN60529
	Cable entry	Single entry, M20 for cable max. D=8mm
	Basic sensor plate	Copper, 80mm x 15mm x 1.5mm
	Clamps	Pluggable terminal max. 1.5mm <sup>2</sup>
	Ambient temperature	-3570°C
	Transport	-3570°C, max 85% RH, non-condensating
	Weight	190g
Type WK01 / WK01ext	Power supply	DC 15-24V(±10%) or AC 24V(±10%)
	Power consumption	Typical 0.8W / 1.6VA
	Switching output	Relay with change-over contact, floating,
		load max. 24V / 1A (ohmic)
	Contact material	AgNi + Au (5µm)
	Sensor wire length (WK01ext only)	2m

# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician. Isolate installation before removal of cover (disconnect fuse) and protect against reconnection.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

# **Electrical connection**

The condensation detector is constructed for the operation of DC or AC 24V SELV (WK01 and WK01ext). For the electrical connection, the technical data of the corresponding device is valid.

The devices must be operated at a constant supply voltage. When switching the supply voltage on/off, power surges must be avoided on site.

## **Mounting advice**

For detection of water condensation, the sensor must be mounted on the moistest point of the medium. Please ensure a good thermal contact to the measuring medium. We recommend the use of contact fluid on the connector sensor / medium.

Mounting effects by means of included cable ties (binders). Mounting can be made directly on a pipeline.

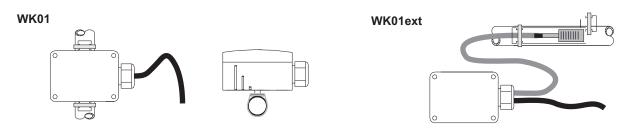
When measuring clean air, the measuring element becomes maintenance free. Aggressive and solvent atmosphere might, depending on type and concentration, damage the sensor. Moreover, such atmosphere could lead to measuring errors. This is the same for dirt on the sensor foil.



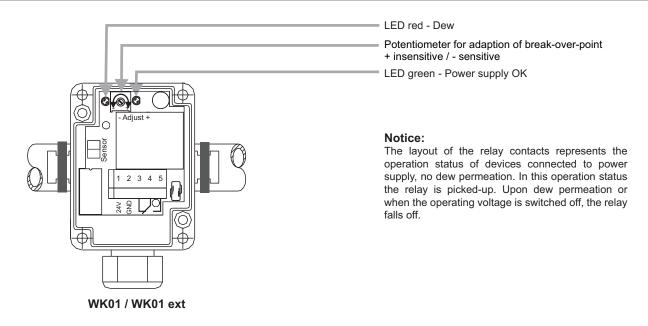
# Mounting advice (cont.)

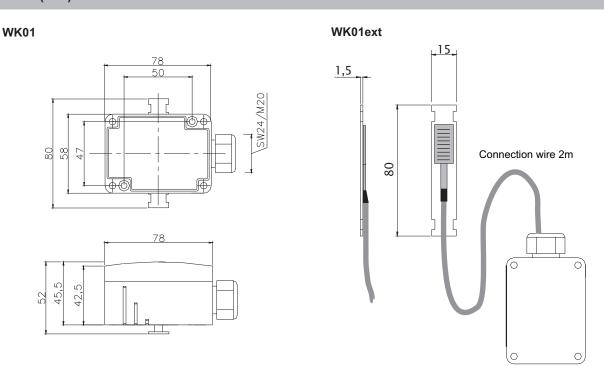
## Adjustment of break-over point

According to local conditions, the threshold value (break-over point) must be adapted accordingly. The adaption is made by means of the trimming potentiometer within the housing.



# **Terminal connection plan**







The room operating panel is designed for temperature detection and integrated manual control of HVAC applications (change set point, occupancy, fan speed).

The operating functions can be used very flexibly depending on the room requirements. Thus, different types with various numbers of function keys are available.

The universal room operating panel has a wiring clamp, where the sensor or the operating element (potentiometer, rotary switch, pushbutton, ...) is

The device disposes of the following features

- Different function keys depending on the device type, e.g. for set point or occupancy or fan speed
- LED for status indication
- Integrated temperature sensor
- For wall mounting, mounting on standard installation box is possible



## Types available

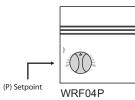
Type code	Туре	Description
EXT-TN-1070408	WRF04 Ni1000	Ni1000
EXT-TN-1066579	WRF04 PT1000	PT1000
EXT-TN-1070415	WRF04 NTC10k	NTC10k
EXT-TN-1072600	WRF04 NTC10kPRE	NTC10k Precon
EXT-TN-1072617	WRF04 NTC10kPRE11k	NTC10k Precon 11k
EXT-TN-1066586	WRF04 NTC20k	NTC20k
EXT-TN-1070712	WRF04 TRA MultiRange	420mA
EXT-TN-1070736	WRF04 TRA3	420mA
EXT-TN-1070750	WRF04 TRV MultiRange	010V
EXT-TN-1070774	WRF04 TRV3	010V
EXT-TN-1072655	WRF04P PT1000	PT1000, 1k Potentiometer
EXT-TN-1072631	WRF04P NTC10k	NTC10k, 1k Potentiometer
EXT-TN-1072648	WRF04P NTC10kPRE	NTC10k Precon, 1k Potentiometer
EXT-TN-1070484	WRF04P Ni1000	Ni1000, 10k Potentiometer
EXT-TN-1070538	WRF04P PT1000	PT1000, 10k Potentiometer
EXT-TN-1070507	WRF04P NTC20k	NTC20k, 10k Potentiometer
EXT-TN-1070569	WRF04PS Ni1000	Ni1000, 10k Potentiometer, fan speed
EXT-TN-1070613	WRF04PS PT1000	PT1000, 10k Potentiometer, fan speed
EXT-TN-1070583	WRF04PS NTC20k	NTC20k, 10k Potentiometer, fan speed
EXT-TN-1072686	WRF04T PT1000	PT1000, pushbutton
EXT-TN-1072662	WRF04T NTC10k	NTC10k, pushbutton
EXT-TN-1072679	WRF04T NTC10kPRE	NTC10k Precon, pushbutton
EXT-TN-1072716	WRF04TD PT1000	PT1000, pushbutton, LED
EXT-TN-1072693	WRF04TD NTC10k	NTC10k, pushbutton, LED
EXT-TN-1072709	WRF04TD NTC10kPRE	NTC10k Precon, pushbuton, LED
	(T) Door	nbutton (T) Pushbutton
	(1) Pusi	nbutton (1) Pushbutton
		(D) Status LED

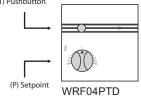


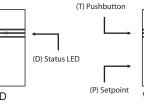
WRF04 TRV

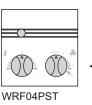
WRF04P sensor

WRF04PS sensor











V1.1 02.2012 · Subject to modification

WRF04 sensor Room operating panel, temperature sensor WRF04 TRA Room operating panel, 4...20mA temperature output

Room operating panel, 0...10V temperature output Room operating panel, potentiometer, temperature sensor

Room operating panel, potentiometer, fan speed, temperature sensor

WRF04T sensor Room operating panel, pushbutton, temperature sensor WRF04TD sensor Room operating panel, pushbutton, LED, temperature sensor



# **Technical data**

#### **Standards**

#### **General Data**

CE conformity	2004/108/EEC EMC directive	
EN conformity	- EN60730-1(2000) Interference resistance	
	- EN60730-1(2000) Emitted interference	
Power supply	- TRV : DC 15-24V(±10%) / AC 24V(±10%)	
	- TRA: DC 15-24V(±10%)	
Power consumption	- TRV : max. 12mA / DC 24V	
	- TRA: max. 20mA / DC 24V	
Measuring range	Adjustable at the transducer	
	- TRA1 : -50°C+50°C	
	- TRA3 : 0°C+50°C	
	- TRA8 : -15°C+35°C	
	- TRV1 : -50°C+50°C	
	- TRV3 : 0°C+50°C	
	- TRV8 : -15°C+35°C	
Output	- Sensor : depending on sensor used	
	- TRV : 010V, min. load 5kΩ	
	- TRA : 420mA, max. load 700Ω / DC 24V	
Accuracy@21°C	- Sensor : depending on sensor used	
	- TRV/TRA: 1% of full scale	
Potentiometer (P)	Output resistance $1k\Omega$ or $10k\Omega$ , 3 wire, max.	
	load 0.25W	
Rotary switch (S)	5 stages (Auto,0,I,II,III), max. load 5VA	
Presence key (T)	Close contact, max. load 600mW	
Status LED (D)	Colour green, supply voltage DC 15-24V /	
	AC 24V	
Clamps	Terminal screws, max. 1.5mm <sup>2</sup>	
Enclosure	For wall mounting, material ASA,	
	colour pure white, similar to RAL9010	
Protection	IP30 according to EN60529	
Cable entry	From behind or side-mounted entry from top /	
-	below	
Ambient temperature	-3570°C	
Transport	-3570°C / max. 85% RH, non-condensing	
Weight	50g	

# Security advice /

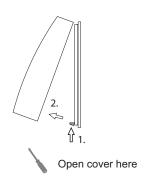
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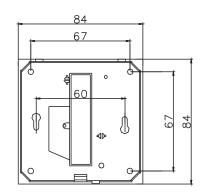
The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

# **Mounting advice**

The devices are supplied in an operational status. Installation is made by means of rawl plugs and screws (accessory) to the smooth wall surface. For wiring, the snap-on lid must be separated from the base plate.

Installation must be made on representative places for the room temperature, to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. If the device is mounted on standard flush box, the end of the installation tube in the flush box must be sealed, so as to avoid any draught in the tube falsifying the measuring result.





Base plate



## **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid. With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics. Due to the self heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

The transducers must be operated at constant supply voltage. The adjustment of the measuring ranges is made by changing the bonding jumpers (see terminal connection diagram). The output value in the new measuring range is available after approximately 2 seconds.

## Location and accuracy of room sensor

Besides a suitable representative mounting place, corresponding to the room temperature, the accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important that the flush socket is completely closed at the wall side, so that the circulation of air may take place through the gaps in the cover. Otherwise, deviations in temperature measurement will occur due to uncontrolled air circulation. Furthermore, the temperature sensor should not be covered by furnitures, etc. A mounting place next to doors (occurring draught) or windows (colder outside wall) should be avoided.

### Surface and flush mounting

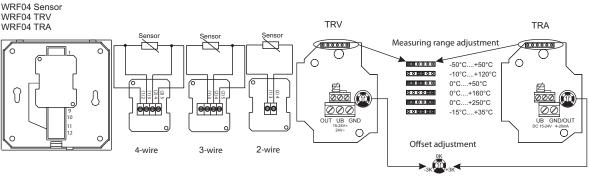
The temperature dynamics of the wall influence the measurement result of the sensor. Various wall types (brick, concrete, dividing and hollow brickwork) have different behaviour with regard to thermal variations. A solid concrete wall responds to thermal fluctuations within a room in a much slower way than a light-weight structure wall. Room temperature sensors installed in flush boxes, have a longer response time to thermal variations. In an extreme case, they detect the radiant heat of the wall even if the air temperature in the room is lower. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor, the smaller are the deviations limited in time.

## Build up of self heating by electrical dissipated power

Room temperature sensors with electronic components always have a dissipated power, which affects the temperature measurement of the ambient air. The dissipation in active temperature sensors shows a linear increase with rising operating voltage. This dissipated power has to be considered when measuring temperature. In case of a fixed operating voltage, this is normally done by adding or reducing a constant offset value. As transducers (TRA or TRV) work with a variable operating voltage, only one operating voltage can be taken into consideration, for reasons of production engineering. Transducers 0-10V / 4-20mA have a standard setting at a operating voltage of DC 24V. Therefore at this voltage, the expected measuring error of the output signal will be the least. As for other operating voltages, the offset error will be increased or lowered by a changing power loss of the sensor electronics. If a re-cablibration should become necessary later directly on the sensor, this can be done by means of a trimming potentiometer on the sensor board (For sensors with LON-interface, a re-calibration can be done via corresponding software variable SNVT).

Remark: Occurred draft leads to a better carrying-off of dissipated power at the sensor. Thus, temporal limited fluctuations might occur upon temperature measurement.

## Terminal connection plan

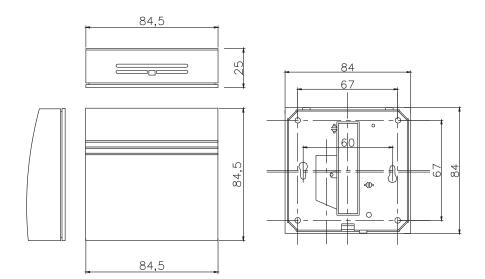


WRF04 P Sensor WRF04 PTD Sensor

(Sensor, Potentiometer) (Sensor, Potentiometer, Pushbutton, Status LED)

Notice:
Depending on respective design, the device has a different configuration of terminals. The connection plan attached to each device is valid!







The sensor is designed for the detection of carbon dioxide (CO2), temperature and relative humidity (optionally) in living spaces. Wherever people are staying in rooms, the CO2 concentration is an evident indicator for the room quality.

For the CO2 measurement the "Non Dispersive InfraRed (NDIR) Technology" with automatic self-calibration is used. For a direct locking-on to a DDC or a monitoring system, analog 0...10V outputs are available. Additionally, the devices WRF04 CO2 ... can be supplied with a passive temperature sensor e.g. PT100, PT1000, NTC10k etc.

#### **Technical details**

- Room sensor for measuring the CO2 concentration and temperature in rooms
- Measuring range 0...2000ppm and 0...50°C
- Output 0...10V
- Power supply DC 15-24V / AC 24V
- Passive temperature sensor at option (not available for type LK CO2)
- Optionally with LCD display to show CO2 concentration, temperature and relative humidity
- Optionally with 3 LED to show the CO2 concentration
- Optionally with analog output for relative humidity

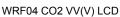






WRF04 CO2 VV(V)-Z







## Types available

Type code	Туре	Description
EXT-TN-1071498	LK CO2 V	Duct CO2, 010V
EXT-TN-1072372	LK CO2 V -R	Duct CO2, 010V and relay
EXT-TN-1066661	LK CO2 V -Z	Duct CO2, 010V, 3 LEDs
EXT-TN-1066678	LK CO2 V -LCD	Duct CO2, 010V, LCD display
EXT-TN-1066692	WRF04 CO2 V	Room CO2, 010V
EXT-TN-1072587	WRF04 CO2 V -R	Room CO2, 010V and relay
EXT-TN-1071436	WRF04 CO2 VS NTC10k	Room CO2, 010V, temperature, NTC10k
EXT-TN-1071443	WRF04 CO2 VV	Room CO2, 010V, temperature, 010V
EXT-TN-1066685	WRF04 CO2 VV -Z	Room CO2, 010V, temperature, 010V, 3 LEDs
EXT-TN-1066708	WRF04 CO2 VV -LCD	Room CO2, 010V, temperature, 010V, LCD display
EXT-TN-1071450	WRF04 CO2 VVV	Room CO2, 010V, temperature and humidity, 2x 010V
EXT-TN-1072594	WRF04 CO2 VVV -R	Room CO2, 010V and relay, temperature and humidity, 2x 010V
EXT-TN-1071467	WRF04 CO2 VVV -Z	Room CO2, 010V, temperature and humidity, 2x 010V, 3 LEDs
EXT-TN-1071474	WRF04 CO2 VVV -LCD	Room CO2, 010V, temperature and humidity, 2x 010V, LCD display

#### Remarks

- R	Relay output which is switching on / off at an adjustable CO2-switching threshold
- LCD	LCD display for indicaton of measuring values and setting of properties
- Z	3 LEDs for display of CO2 concentration

## **Technical data**

Standards	CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> <li>2001/95/EG Product safety</li> </ul>
	EN conformity	- EN60730-1:2002 EMC
		<ul> <li>EN60730-1:2002 Product safety</li> </ul>



# Technical data (cont.)

General data	Power supply	DC 15-24V(±10%) or AC 24V(±10%)
	Power consumption	Max. 3W / max. 6VA
	Clamps	Terminal screw, max. 1,5mm², wire or braid
	Analog outputs	- CO2 : 010V, load max. 10mA
	•	- Temperature : 010V, load max. 10mA
		(Device with active temperature output only)
		<ul> <li>Relative humidity: 010V, max. load 10mA</li> </ul>
		(Device with active humidity output only)
	CO2 Sensor	02000ppm, NDIR (non-dispersive infrared)
	Temperature dependence	CO2 < 0.2% of full scale per °C
	Accuracy @21°C	- CO2 : typical ±40ppm + 4% of reading
	,	<ul> <li>Temperature : typical ±1K of full scale</li> </ul>
		- Humidity : typical ±3%
		(between 2080% rH)
	Warm Up Time	< 2 minutes
	Response Time	< 10 minutes
	Stability CO2	< 2% full scale over life of sensor
		(typical lifetime 15 years)
	Repeatability CO2	<1% of full scale
	Calibration interval	Not required - see ABCLogic
	Housing	- LK CO2
		Connection head : PC with transparent cover
		Sensor tube : steel, galvanized, length
		300mm, Φ30, with mount-
		ing flange
		- WRF04 CO2
		Material ASA, colour pure white
	Housing protection	IP20 according to EN60529
	Ambient temperature	0+50°C, max. 85% RH non-condensing
	Weight	- WRF04 CO2 : 90g
		- LK CO2 : 1300g
Option -R	Relay output	Changeover contact, floating max. 2A, max. DC
-		24V / AC 24V
		Relay switch on if the CO2 value reaches the
		adjusted setpoint (hysteresis : 100ppm)
Option -Z	3 LEDs	3 LEDs to show the CO2 concentration:
•		0750ppm : Green LED on
		7511250ppm : Yellow LED on
		12512000ppm : Red LED on
Option -LCD	LCD display	Shows the measurement values and param-
=		eters

# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

## **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid. Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

The transducers must be operated at a constant supply voltage(±0,2V). When switching the supply voltage on/off, power surges must be avoided on site.

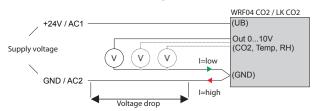
When using long connection wires (depending on the used cross section) the measuring result might be falsified due to a voltage drop at the common GND wire (caused by the voltage current and the line resistance). In this case, 2 GND wires must be laid to the CO2 sensor - one for the supply voltage and one for the measuring current.



## **Electrical connection (cont.)**

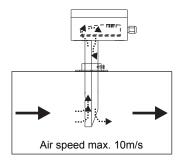
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#### 2 GND wires for long connection wires



# Mounting advice LK CO2

The devices are supplied in a ready to use condition and are already equipped with a 1.5 m connection cable. Thus, there is no need to open the device. If an opening of the cover becomes necessary, however, please make sure that the housing will be hermetically sealed again. The installation in a ventilation duct is made by means of the mounting flange included (fixing screws are not included).



# **Mounting advice WRF04 CO2**

The devices are supplied in an operational status. Installation is made by means of rawl plugs and screws (accessory) to the smooth wall surface

For wiring, the snap-on lid must be separated from the base plate. Installation must be made on representative places for the room temperature, to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. If the device is mounted on standard flush box, the end of the installation tube in the flush box must be sealed, so as to avoid any draught in the tube falsifying the measuring result.

# **Application note**

The DIN EN 13779 defines several classes for the indoor air quality, which are shown in the table below:

	CO2 content over the content in outdoor air in ppm		
Category	Typical range	Standard value	Description
IDA1	<400 ppm	350 ppm	High indoor air quality
IDA2	400 600 ppm	500 ppm	Mean indoor air quality
IDA3	600 1.000 ppm	800 ppm	Moderate indoor air quality
IDA4	>1000 ppm	1200 ppm	Low indoor air quality



## ABCLogic™ - Self calibration feature

#### Introduction

Virtually all gas sensors are subject to some sort of drift. The degree of drift is partially dependent on the use of quality components and good design. But even with good components and excellent design a small amount of drift can still occur in the sensor that may ultimately result in the need for a sensor to be recalibrated. Generally, recalibration involves a maintenance person visiting each sensor in a building and performing a 5 minute to 20 minute recalibration routine using gas bottles and plastic tubing. The calibration process is simple but it can turn into a significant expense if recalibration is required frequently. If the wrong choice of sensors is made, the expense of sensor maintenance may wipe out any potential energy savings that could come from CO2 based demand controlled ventilation.

## What causes sensor drift?

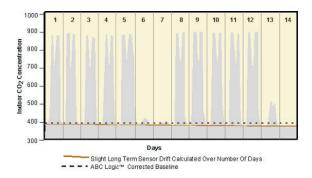
As discussed before, sensor design and components have a lot to do with drift. In the sensor the natural drift of the sensor is very gradual at a few ppm per month with the greatest drift occurring in the first few months of operation. This drift can be up or down. The self-calibration feature called ABCLogic™is designed to correct all sensor drift including ageing of the light source.

#### How it works

Outside levels of CO2 are generally very low at around 400 to 500 ppm. Inside buildings people are the major source of CO2. When a building is unoccupied for 4 to 8 hours CO2 levels will tend to drop to outside background levels. This is especially the case if the building operational schedule includes a pre-occupancy purge of fresh air into the building prior to the start of the day.

ABCLogic™ which stands for "Automatic Background Calibration" utilizes the computing power in the sensor's on-board microprocessor to remember the lowest CO2 concentration that takes place every 24 hours. The sensor assumes this low point is at outside levels. The sensor is also smart enough to discount periodic elevated readings that might occur if for example a space was used 24 hours per day over a few days. Once the sensor has collected 14 days worth of low concentration points it performs a statistical analysis to see if there has been any small changes in the sensor reading over background levels that could be attributable to sensor drift. If the analysis concludes there is drift, a small correction factor is made to the sensor calibration to adjust for this change.

The figure below shows CO2 concentrations as they might occur over 14 days in an office space with peak concentrations occurring in the morning and afternoon of each day. The dotted line is drawn through all the low points for each day as compared to an assumed background of 400 ppm. If a statistically relevant change in the data shows a shift above or below background, a slight adjustment is made to sensor calibration as shown by the solid level line. Every day the sensor looks at the past 14 days worth of data and determines if a calibration adjustment is necessary.



When using CO2 to measure and control for ventilation it is most important to consider not the absolute ppm levels but the differential concentration between inside and outside concentrations. One of the additional benefits of ABCLogic™is that the sensor is calibrated to outside levels without having the expense and trouble of placing a sensor in the outside air. The sensor assumes that the lowest level is 400 ppm. Any readings above this level are related to the differential.

#### Application for ABCLogic™

It is important to note that ABCLogic<sup>™</sup> is designed for use in applications where spaces are periodically unoccupied for 4 hours per day or more so that indoor concentrations can drop down to typical outside levels.

NOTE! The CO2 sensor is not suitable for environments where the CO2 concentrations are consistently elevated, because the unit automatically adjusts its calibration to daily low ambient CO2 levels.

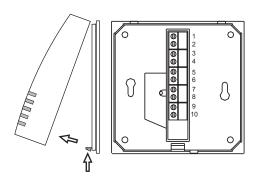
#### Commissioning Sensors with ABCLogic™

When first installed CO2 sensors with ABCLogic<sup>™</sup>, the sensors will use the first 14 days of operation to calibrate themselves to local background levels. Each sensor will calibrate itself to its environment over the first 14 days of operation.



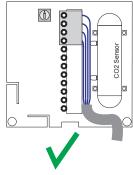
# **Terminal connection plan**

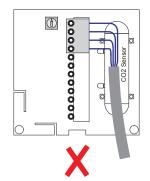




Clamp	WRF04 CO2 VV(V)
1	GND / AC2
2	UB +24V / AC1
3	Temp. 010V
4	CO2 010V
5	Rel. Humidity 010V 3)
6	Sensor A 3)
7	Sensor B 3)
8	Relay C 3)
9	Relay NO 3)
10	Relay NC 3)

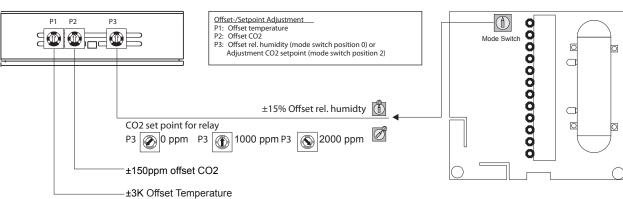
3) Optional



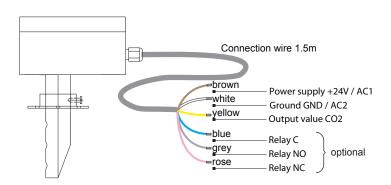


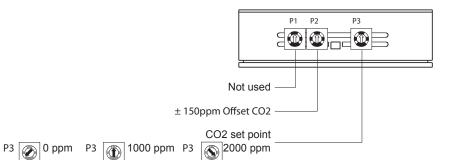


Avoid laying the cable on the CO2 sensor, because this may damage the device and influence the measuring values.



#### LK CO2

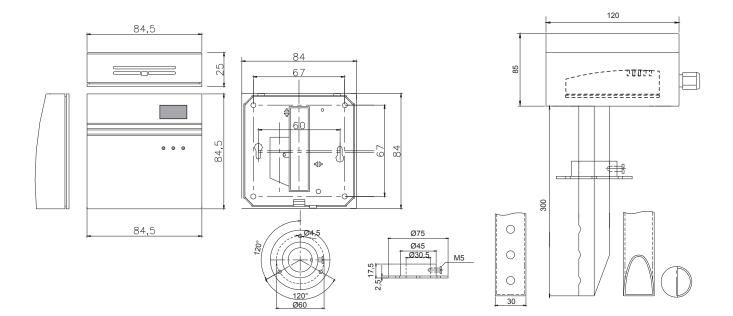




# Offset-/Setpoint Adjustment

P2: Offset CO2 P3: Adjustment CO2 setpoint







Motion sensor for presence detection in rooms and offices. Model WRF04l specially constructed for wall mounting. Model RDI specially constructed for installation in ceilings. Designed for locking on control and display systems.



## Types available

Type code	Туре	Description
EXT-TN-1072624	WRF04I	Surface mount motion sensor, PIR
EXT-TN-1071535	RDI	Ceiling mount motion sensor, PIR

#### **Technical data**

Standards	CE conformity	- 2004/108/EG electromagnetic compatibility		
		- 2001/95/EG Product safety		
	EN conformity	- EN60730-1:2002 EMC		
		- EN60730-1:2002 Product safety		
General data	Measuring element	PIR, passive infrared principle		
	Coverage	Conical, aperture angle 100°, range 10m,		
	· ·	80 zones. Circular with radius of approximately		
		3.2m for a mounting height of 2.8 m, partitioned		
		in 80 zones		
		(Diameter D = Mounting height H x 2.3)		
	Power supply	DC 15-24V / AC 24V(±10%)		
	Clamp Terminal strip max. 1.5mm <sup>2</sup>			
	Ambient temperature -20+50°C, max. 85% RH non-condensi			
	Protection	IP20 according to EN60529		
Type WRF04I, RDI	Power comsumption	0.5W / 1.1VA		
,	Output	Dry relay contact (close), max. load 24V / 1A,		
		with fixed after-running time of approximately		
		8 seconds		
	Enclosure	- WRF04I : ABS, colour white similar to		
		RAL9010		
		- RDI : Ceiling installation ring, metal,		
		colour white		
	Weight	- WRF041 : 85g		
	3	- RDI : 55g		

# Security advice <u>M</u>

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

## **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

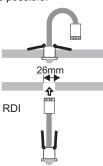
The transducers must be operated at a constant supply voltage (±0.2V).

When switching the supply voltage on/off, power surges must be avoided on site.

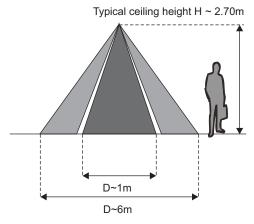


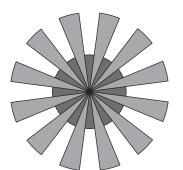
# **Mounting advice**

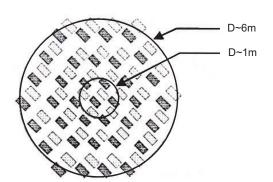
For model WRF04I installation on a standard ISO box is possible.

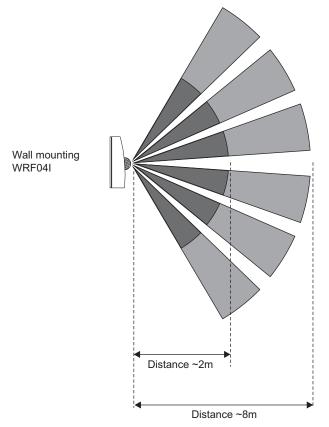


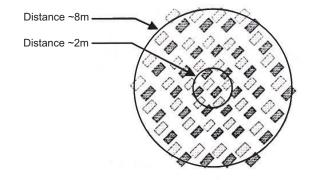
# **Detection range**













# **Terminal connection plan**

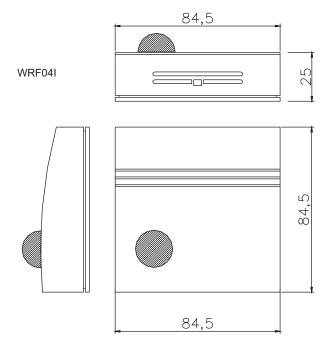
# WRF04I

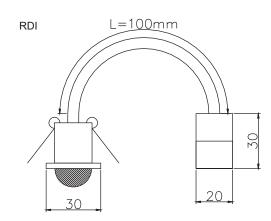
1	2	3	4	5	6	7	8	9	10	11	12
		GND		Uv 15-24V= 24V~	Out relay	Out relay					

RDI

DC 15-24V

RO2 RO1		
Gnd	3	
/ AC 24V	4	







The room operating panel with display is designed for temperature detection and integrated manual control of HVAC applications (change set point, change occupancy, change fan speed).

The operating functions can be used very flexiblly depending on the room requirements. Thus, different types with various numbers of function keys are available.

The universal room operating panel has a wiring clamp, where the sensor or the operating element (potentiometer, rotary switch, push button, ...) is wired up.

The device disposes of the following features

- Different function keys depending on the device type, e.g. for set point or adjustment occupancy or fan speed adjustment
- LCD display for indication of room temperature
- LED for status indication
- Integrated temperature sensor
- For wall mounting, mounting on standard installation box possible



## Types available

Type code Type Description

EXT-TN-1066593 WRF04 LCD TRV3 0...10V, with LCD display



WRF04 LCD

#### **Technical data**

Standards	CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> </ul>
	•	<ul> <li>2001/95/EG Product safety</li> </ul>

#### General data

	- 2001/95/EG Product safety
EN conformity	- EN60730-1:2002 EMC
,	- EN60730-1:2002 Product safety
Power supply	DC 15-24V (±10%) or AC 24V (±10%)
Power consumption	Typical 0.6W / 1.0VA
Measuring range	TRV3:0°C+50°C
Output	010V, min. load 5kΩ
Accuracy@21°C	1% of full scale
Response time	15 minutes
LCD display	29mm x 12mm, colour black/white
Functions display	Room temperature
Clamps	Terminal screws, max. 1.5mm <sup>2</sup>
Enclosure	Material ASA, colour pure white, similar to
	RAL9010
Protection	IP30 according to EN60529
Cable entry	From behind or side-mounted entry from top /
	bottom
Ambient temperature	-3570°C
Transport	-3570°C, max. 85% RH, non-condensing

# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

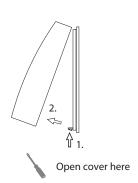
The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

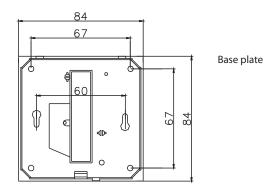


## **Mounting advice**

The devices are supplied in an operational status. Installation is made by means of rawl plugs and screws (accessory) to the smooth wall surface. For wiring, the snap-on lid must be separated from the base plate.

Installation must be made on representative places for the room temperature, to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. If the device is mounted on standard flush box, the end of the installation tube in the flush box must be sealed, so as to avoid any draught in the tube falsifying the measuring result.





#### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid. With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics. Due to the self-heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

The transducers must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

The adjustment of the measuring ranges is made by changing the bonding jumpers (see terminal connection diagram). The output value in the new measuring range is available after approximately 2 seconds.

## Location and accuracy of room sensors

Besides a suitable representative mounting place, corresponding to the room temperature, the accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important that the flush socket is completely closed at the wall side, so that the circulation of air may take place through the gaps in the cover. Otherwise, deviations in temperature measurement will occur due to uncontrolled air circulation. Furthermore, the temperature sensor should not be covered by furnitures, etc. A mounting place next to doors (occurring draught) or windows (colder outside wall) should be avoided.

## Surface and flush mounting

The temperature dynamics of the wall influence the measurement result of the sensor. Various wall types (brick, concrete, dividing and hollow brick work) have different behaviour with regard to thermal variations. A solid concrete wall responds to thermal fluctuations within a room in a much slower way than a light-weight structure wall. Room temperature sensors installed in flush boxes have a longer response time to thermal variations. In an extreme case, they detect the radiant heat of the wall even if the air temperature in the room is lower. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor, the smaller are the deviations limited in time.

#### Build up of self heating by electrical dissipated power

Room temperature sensors with electronic components always have a dissipated power, which affects the temperature measurement of the ambient air. The dissipation in active temperature sensors shows a linear increase with rising operating voltage. This dissipated power has to be considered when measuring temperature. In case of a fixed operating voltage (±0.2V), this is normally done by adding or reducing a constant offset value. As transducers work with a variable operating voltage, only one operating voltage can be taken into consideration, for reasons of production engineering. Transducers 0...10V / 4...20mA have a standard setting at an operating voltage of DC 24V. At this voltage, the expected measuring error of the output signal will be the least. As for other operating voltages, the offset error will be increased or lowered by a changing power loss of the sensor electronics. If a re-cablibration should become necessary later directly on the sensor, this can be done by means of a trimming potentiometer on the sensor board (For sensors with LON-interface, a re-calibration can be done via corresponding software variable SNVT). Remark: Occurred draft leads to a better carrying-off of dissipated power at the sensor. Thus, temporal limited fluctuations might occur upon temperature measurement.



Screw-in sensor for measuring temperature in liquid and gaseous media of heating, cooling and air-conditioning systems (e.g. in pipeline systems). Designed for locking on to control and display systems.



# Types available

Type code	Туре	Description
EXT-TN-1066630	SFK01.200.08 NTC10k	NTC10k, Pocket L 200mm, Φ8
EXT-TN-1072471	SFK02.100.08 PT1000	PT1000, Pocket L 100mm, Φ8
EXT-TN-1072440	SFK02.100.08 NTC10k	NTC10k, Pocket L 100mm, Φ8
EXT-TN-1072457	SFK02.100.08 NTC10kPRE	NTC10k Precon, Pocket L 100mm, Φ8
EXT-TN-1072464	SFK02.100.08 NTC10kPRE11k	NTC10k Precon 11k, Pocket L 100mm, Φ8
EXT-TN-1072495	SFK02.100.08 TRA3	420mA, Pocket L 100mm, Ф8
EXT-TN-1072501	SFK02.100.08 TRA4	420mA, Pocket L 100mm, Ф8
EXT-TN-1072518	SFK02.200.08 NTC10k	NTC10k, Pocket L 200mm, Φ8

# **Technical data**

Standards	CE conformity	2004/108/EG Electromagnetic compatibility
	EN conformity	- EN60730-1(2000) Interference resistance
		- EN60730-1(2000) Emitted interference
General data	Mounting lengths L	100mm/200mm
	Operating temperature	-50160°C
	Sensor bushing	Stainless steel, material 1.4571 suitable up to
		40bar
	Screw-in part	SW24, G1/2", stainless steel material 1.4305
	Connection head	- SFK01: Form J, material aluminium
		- SFK02: Polyamide, colour white
	Protection	IP65 according to EN60529
Type sensor	Measuring element	Sensor according to customer's request
	Measuring range	Depending on sensor used
	Accuracy	Depending on sensor used
	Measuring current	Typical <1mA
	Clamps	- 2 pole (two wire)
		- 3 pole (three wire)
		- 4 pole (four wire)
		Terminal screw max 1.5mm <sup>2</sup>
	Cable entry	- SFK01 : M16
		<ul> <li>SFK02 : Single entry, M16 for cable with max.</li> </ul>
		D=8mm
	Ambient temperature	Connection head
		- SFK01 : -2570°C
		- SFK02 : -3570°C
	Weight	- SFK01 : 195g
		- SFK02 : 155g
Type TRA (only SFK02)	Power supply	DC 15-24V(±10%)
	Power consumption	Max. 20mA / DC 24V
	Measuring range	Adjustable at the transducer
		- TRA2 : -10°C+120°C
		- TRA3 : 0°C+50°C
		- TRA4 : 0°C+160°C
	Output	420mA, max. load 500Ω / DC 24V
	Accuracy@21°C	Typical 1% of measuring range
	Clamps	2 pole (two wire)
		Terminal screw max. 1.5mm <sup>2</sup>
	Cable entry	Single entry, M20 for cable max. D=8mm
	Ambient temperature	Connection head
		-3570°C
	Transport	-3570°C / max 85% RH, non-condensing
	Weight	SFK02: 180g



# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

#### Mounting advice

For risk of condensate permeation in the sensor tube, the bushing must be installed so that occurred condensate can run off. Material for sealing of single or double cable entry into the pipeline system is not included in delivery.

### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics.

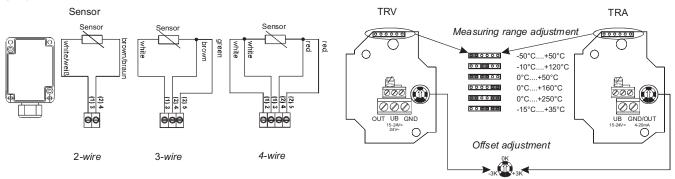
Due to the self heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage.

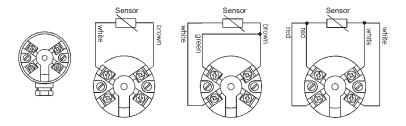
The adjustment of the measuring ranges is made by changing the bonding jumpers (see terminal connection diagram). The output value in the new measuring range is available after approximately 2 seconds.

#### Terminal connection plan

#### SFK02



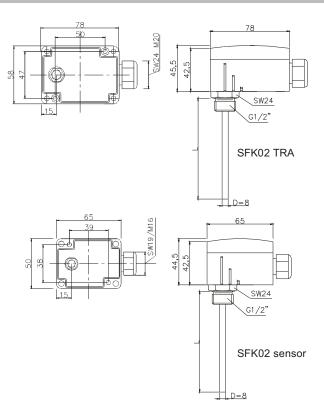
#### SFK01

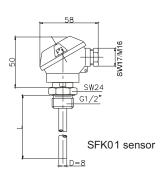


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With electronic sensors such as AD592, SMT160, LM235, DS1820 the following applies: brown = plus (+), white = minus (-), green = out

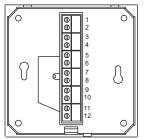








# **Terminal connection plan**



- 1: GND
- 2: DC 15-24V or AC 24V 3: OUT Temperature 0-10
  - **OUT Temperature 0-10V**
- 4: OUT Set point 0-10V

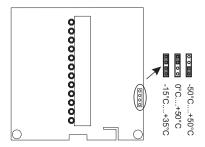


#### Notice

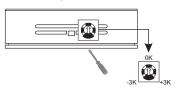
Depending on respective design, the device has different configuration of terminals. Please refer to connection plan attached to each device

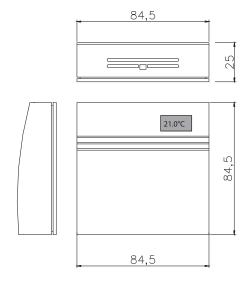
Clamps depending on respective design

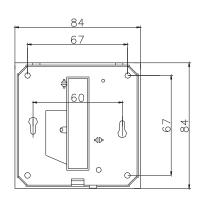














Cable sensor for temperature measurement in gaseous media of heating, cooling or air-conditioning systems (e.g. fresh air / exhaust air ducts). Designed for locking on to control and display systems. In conjunction with an immersion pocket, also suitable for temperature measurement in liquid fluids (e.g. pipeline systems).



# Types available

Type code	Туре	Description
EXT-TN-1070989	TF25.200.06 6x50 NTC10k	NTC10k, Pocket L 50mm, Φ6, connection wire 2m
EXT-TN-1072532	TF25.200.06 6x150 NTC10k	NTC10k, Pocket L 150mm, Φ6, connection wire 2m
EXT-TN-1072549	TF25.200.06 6x150 NTC20k	NTC20k, Pocket L 150mm, Φ6, connection wire 2m
EXT-TN-1072556	TF25.200.06 6x150 PT1000	PT1000, Pocket L 150mm, Φ6, connection wire 2m
EXT-TN-1072563	TF25.200.06 6x150 TRV1	010V, Pocket L 150mm, Φ6, connection wire 2m

# **Technical data**

Standards	CE conformity	2004/108/EG Electromagnetic compatibility
	EN conformity	- EN60730-1 (2000) Interference resistance
		- EN60730-1 (2000) Emitted interference
General data	Sensor wire L	2m, cable ends with conductor sleeves as
		standard
	Conductor cross section	0.25mm <sup>2</sup>
	Operative temperature	- PVC / HT : -35100°C
		- Silicone : -50180°C
		- Special silicone : -60250°C
	Sensor bushing	Stainless steel material 1.4571
	Diameter	6mm
	Mounting lengths	150mm
Type sensor	Measuring element	According to customer's request
	Measuring range	Depending on sensor used
	Accuracy	Depending on sensor used and wire length
	Measuring current	Typical <1mA
	Connection	- 2 pole (two wire)
		<ul> <li>3 pole (three wire), not available with special</li> </ul>
		silicone
		<ul> <li>4 pole (four wire), not available with special</li> </ul>
		silicone
	Weight	30g
Type TRV	Power supply	DC 15-24V(±10%) or AC 24V(±10%)
	Power consumption	Typical 0.45W / 0.8VA
	Measuring range	Adjustable at the transducer
	- <del>_</del>	TRV1:-50°C+50°C
	Output	010V, min. load 5kΩ
	Accuracy@21°C	Typical ±1% of measuring range with wire
	- <del></del>	conductor of max. 2m
	Clamps	3 pole (three wire)
		Terminal screw max 1.5mm²
	Enclosure	Material polyamide, colour white
	Protection	IP65 according to EN60529
	Cable entry	Single entry, M20 for cable max. D=8mm
	Ambient temperature	-3570°C
	Transport	-3570°C / max. 85% RH, non-condensing
	Weight	145g



# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

## Mounting advice

Depending on the application, the cable temperature sensor is assembled to the air duct by means of a mounting flange respectively a clamp screw joint.

Operation of the sensor with an immerision pocket, should use contact fluid for better heat transfer between sensor and measuring medium. When using our sensing elements in moist rooms or for purposes in refrigeration technology, we recommend to use version IP67.

#### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

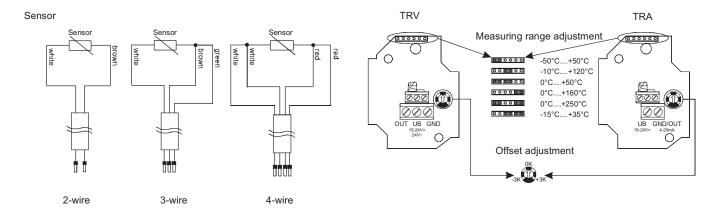
With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor version, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics.

Due to the selfheating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage.

The adjustment of the measuring ranges is made by changing the bonding jumpers (see terminal connection diagram). The output value in the new measuring range is available after approximately 2 seconds.

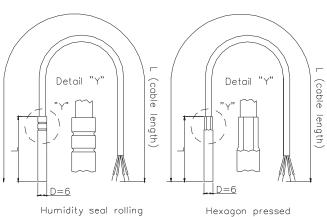
### Terminal connection plan



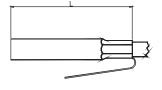


# Dimensions (mm)

# TF25 sensor

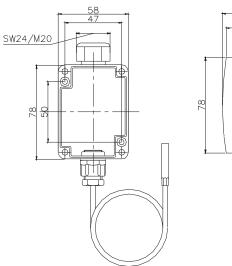


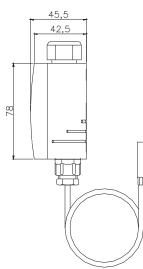




TF25 with tension spring

# TF25 TRV







The frost protection thermostat TFR is used for downstream temperature monitoring of water air heaters in ventilation and air-conditioning systems to prevent frost damages. It has a small differential gap and a good repeatability. The reset can be done automatically. For model TFR...-R reset is made manually by a button.

The frost protection thermostat can be used to initiate the following frost protection functions:

- Stop fan
- Close outside air dampers
- Open heating coil valve 100%
- Star heating coil pump
- Switch-off chiller (condenser) and humidifier
- Trip visual and/or audible frost alarm



## Types available

Type code	Туре	Description
EXT-TN-1071382	TFR3	Capillary tube length 3m, automatic reset
EXT-TN-1071405	TFR3-R	Capillary tube length 3m, manual reset
EXT-TN-1071399	TFR6	Capillary tube length 6m, automatic reset
EXT-TN-1071412	TFR6-R	Capillary tube length 6m, manual reset

#### **Technical data**

Star	che	rde

General	Data

CE conformity	<ul> <li>- 2004/108/EG Electromagnetic compatibility</li> <li>- 2001/95/EG Product safety</li> </ul>
EN conformity	- EN60730-1:2002 EMC
•	- EN60730-1:2002 Product safety
Set point adjustment range	-10+15°C (factory setting is 5°C)
Differential gap	<= 2 ± 1°C
Repeatability	±0.5°C
Sensor operating length	Approximate 60cm
Capillary tube length	3m or 6m (depend on type used)
Switching output	Change over contact, max. AC 250V, max. 10A
Contact material	Ag/Ni(90%/10%) gold plated (3µm)
Reset	- TFR : automatically
	- TFRR : manually
Admissible medium	Air
Mounting length	Any
Connecting terminal	Screwing terminal max. 2.5 mm <sup>2</sup>
Cable entry	Cable connection M16x1.5
Protection class	IP65 according to EN60529
Ambient temperature	w+mind. 2K70°C (w=setpoint)
Transport	-3070°C / max. 85% RH, non-condensing
Enclosure	Lower part : PA6 GK30
Material cover	Cover : ABS, transparent
Capillary tube	Material : copper
	Capillary tube filling : R 507

# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician. Isolate installation before removal of cover (disconnect fuse) and protect against reconnection.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

## **Electrical connection**

For the electrical connection, the technical data of the corresponding device is valid.

The device must be operated at a constant supply voltage. When switching the supply voltage on/off, power surges must be avoided on site.



## **Mounting advice**

#### Withdrawable tray

It is recommended to mount the frost protection thermostat on a special withdrawable tray directly downstream of the heating coil. The connecting cable must be long enough to enable the tray to be inserted and removed smoothly. For heating coils with a large cross section several frost protection thermostats can be fitted and connected in series. In such cases, the temperature set point is set individually for each frost protection thermostat.

#### Frost protecton thermostat

The ambient temperature of frost protection thermostat housing (with the test loop) must be at least 2°C above the pre-adjusted set point. If this cannot be guaranteed (e.g. outdoors or in exposed spaces), housing and test loop must be installed inside the supply air unit.

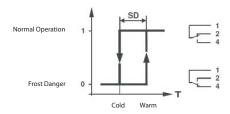
#### Capilliary tube

The capillary tube must be mounted on the downstream side of the heating coil (and on the upstream side in case of cooling coils). It should be looped diagonally across the heat exchanger pipes at a distance of approximately 5cm and should cover the entire area evenly. For test purposes, it is recommended to have a loop of approximately 60cm directly beneath the housing outside the entry to the duct. To prevent damage to the capillary tube a minimum bending radius of 20mm must be ensured. Mounting can be facilitated by using the capillary tube clamps.

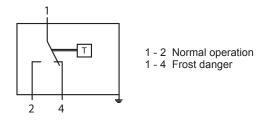


# **Function description**

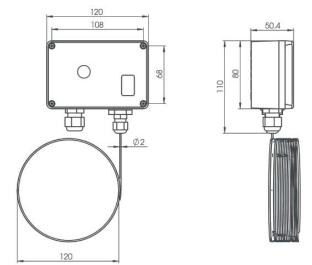
The frost protection thermostat trips when the temperature drops below the selected set point over a capillary length of 60 cm (contact 1-4 closes). Simultaneously contact 1-2 breaks and can be used as a signal contact. An automatic reset is made when the temperature exceeds the the adjusted set point again (contact 1-2 closes). For model TFR...-R manual reset is required by means of the reset button. The TFR... is "self-secured", i.e. in case of a capillary tube diaphragm damage, it switches automatically to the heating function. Contact 1-4 closes and can thus be used as an operating contact. The air temperature is measured over the full length of the capillary tube. The gas filled diaphragm system and the capillary tube form a unit of measurement which is mechanically linked to the micro-switch.



## **Terminal connection plan**









For measuring temperature on pipes and arched surface. Designed for locking on to control and display systems.

Contact temperature sensor VFG54 includes connection housing and clamp.



## Types available

Type code	Туре	Description
EXT-TN-1070835	VFG54 PT100	Contact temperature sensor, PT100
EXT-TN-1066609	VFG54 NTC10k	Contact temperature sensor, NTC10k
EXT-TN-1072570	VFG54 NTC10kPre	Contact temperature sensor, NTC10k Precon

# **Technical data**

Standards	CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> <li>2001/95/EG Product safety</li> </ul>
	EN conformity	- EN60730-1:2002 EMC
		- EN60730-1:2002 Product safety
General data	Sensor bushing	Brass
	Enclosure	Polyamide, colour white
	Protection	IP65 according to EN60529
Type Sensor	Measuring elements	Sensor according to customer's request
	Measuring range	Depending on sensor used
	Accuracy	Depending on sensor used and wire length
	Measuring current	Typical <1mA
	Connection	2 pole (two wire)
		3 pole (three wire)
		4 pole (four wire)
		Terminal screw max 1.5mm <sup>2</sup>
	Cable entry	Single entry, M16 for cable max. D=8mm
	Ambient temperature	Enclosure
		-35+90°C
	Weight	80g

# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

## **Mounting advice**

Fixing by tightening strap. Use contact fluid for better heat transfer between sensor and measuring medium. To avoid permeation of condensate, mount sensor on top of the tube, if possible.

### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid. With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics. Due to the self heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

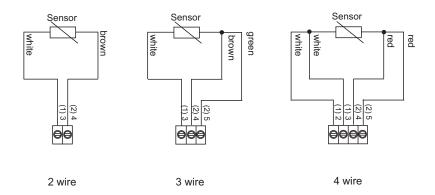
Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

The transducers must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

The adjustment of the measuring ranges is made by changing the bonding jumpers (see terminal connection diagram). The output value in the new measuring range is available after approximately 2 seconds.

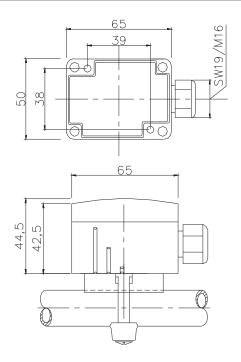


# **Terminal connection plan**



# **A** Caution

With electronic sensors such as AD592, SMT160, LM235, DS1820 the following applies: brown = plus (+), white = minus (-), green = out





The leakage sensor is designed for monitoring occurrence of water pipe bursts and other water ingress in rooms and protect buildings, fixtures and equipments. Suitable for locking on to control and display systems. The device includes sensor and evaluation electronics with pilot LED and relay contact.



### Types available

Type code Type Description

EXT-TN-1071375 LS02 Leakage sensor with relay output

## **Technical data**

Standards	CE conformity	- 2004/108/EG Electromagnetic compatibility - 2001/95/EG Product safety
	EN conformity	- EN60730-1:2002 EMC
		- EN60730-1:2002 Product safety
General data	Power supply	DC 15-24V(±10%) or AC 24V(±10%)
	Power consumption	Typical 0.8W / 1.6VA
	Cable entry	Single entry, M16 for cable max. D=8mm
	Clamps	Pluggable terminal max. 1.5mm²
	Ambient temperature	-3570°C
	Transport	-3570°C / max 85% RH, non-condensing
	Switching output	Relay with change-over contact,
		floating, load max. 24V/1A (ohmic)
	Contact material	Stainless steel 1.4305
	Enclosure	Polyamide, colour white
	Protection	IP65 according to EN60529
	Weight	150g

# Security advice 🔨

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

### Mounting advice

Model LS02 rests on its four contact feet. The detector electrodes are insulated at the lower end so that a background condensation is not detected.

The insulation can be varied in its height (2...4mm) enabling an easy adaption to local conditions.

With normal water, the measuring element is maintenance free. Aggressive and solvent based liquids can damage the sensor or result in faulty measurements depending on nature and concentration. Contamination of the sensor electrodes also ends in faulty measurements.

#### Adjustment of break-over point

According to local conditions, the threshold value (break-over point) must be adapted, accordingly. The adaption is made by means of the trimming potentiometer within the housing.

#### **Electrical connection**

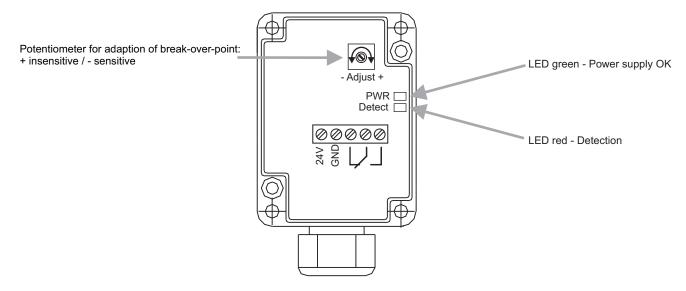
The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

## **Function**

The integrated measuring element is continuously measuring the conductivity of the sensor circuit via four electrodes. If the conductivity is getting too high (e.g. due to water ingresses) the alarm relay is switched (relay contact open) and the red LED indicates water alarm. With power failure the relay contact is also open. In the normal mode the relay is switched on (relay contact mode). The green LED shows the operation.

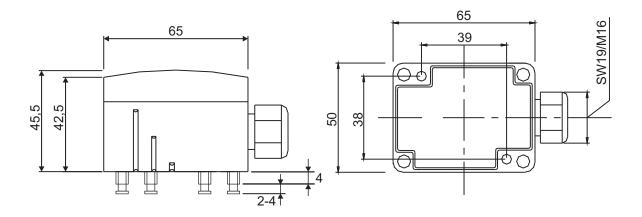


# **Terminal connection plan**



## Notice:

The layout of the relay contacts represents the operation status of "devices connected to power supply, no dew permeation". In this operation status, the relay is picked up. Upon dew permeation or when the operating voltage is switched off, the relay falls off.





The ceiling multi sensor model MDS is designed for occupancy detection in room or office spaces. In addition, the sensor detects the ambient brightness in rooms. The measured quantity can be used for a fixed light control by means of downstream dimming resistances. Optionally, the device is also available with an additional sensor for temperature detection.

By means of the flat construction, the device is specially suitable for an inconspicuous installation in ceiling.

Depending on the model, the multi sensor offers different output interfaces for coupling to a building system.

#### **Functions of the MDS**

- Occupancy detection 360°
- Integrated light sensor
- Integrated temperature sensor
- Different output interfaces, signal relay, 0...10V, LON FTT10 depending on the corresponding type
- Flush mounting installation in ceiling



## Types available

Type code	Туре	Description
EXT-TN-1066869	MDS Standard 1	- PIR occupancy sensor 360°, relay output
		- Light sensor, 010V
EXT-TN-1072396	MDS Standard 3	- PIR occupancy sensor 360°, relay output
		- Light sensor, 010V
		- Temperature sensor, 010V
EXT-TN-1071504	MDS LON 1	- PIR occupancy sensor 360°, LON
		- Light sensor, LON FTT10

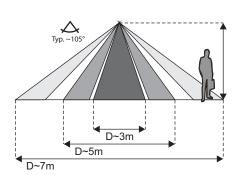
## **Technical data**

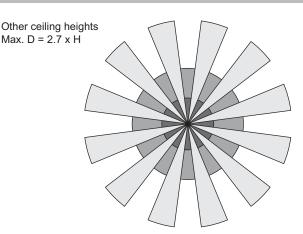
Standards	CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> <li>2001/95/EG Product safety</li> </ul>
	EN conformity	- EN60730-1:2002 EMC
		- EN60730-1:2002 Product safety
General data	Power supply	DC 5-24V / AC 24V(±10%)
	Clamps	Pluggable terminal screw, max. 1.5mm <sup>2</sup>
	Movement sensor	4 Element PIR "passive infrared", with status
		LED for movement detection
	Light sensor	01kLux, photodiode with green filter
	Accuracy	Typical ±50Lux
	Temperature detection	050°C
	Accuracy	Typical ±0.5K
	Basic encloser	Material ABS, colour orange
	Faceplate	Material ABS, colour pure white
	Housing protection	IP20 according to EN60529
	Ambient temperature	050°C
	Transport	-1050°C / max. 85% RH, non-condensing
	Weight	80g
Type MDS Standard 1	Power consumption	Typical 0.6W / 1.5VA
	Analog output (light)	010V, load max. 10mA
Type MDS Standard 3	Power consumption	Typical 0.6W / 1.5VA
	Analog output (light)	010V, load max. 10mA
	Analog output (temperature)	010V, load max. 10mA
	Relay output (occupancy)	No contact, max. 24V / 1A
		Movement detection with variable delay time
		(1sec30min)
Type MDS LON 1	Power consumption	Typical 1.5W / 4.2VA
	LON interface	FTT10, free topology



### **Detection range**







# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

## **Mounting advice**

#### Mounting height

The mounting height has a direct influence on the coverage range of the occupancy sensor. The optimum mounting height is 2.70m. All deviating measures will result in a change of the coverage range.

### **Fixed installation**

The occupancy sensor has to be mounted on a solid ground, as every movement of the sensor leads to a faulty release.

## Distance to switched lamps

In order to avoid an unintended switch on of the lamp released by the occupancy sensor, the lamps should not be mounted in the detection range of the sensor. Moreover, the sensor should not be installed above a lamp. The heat radiation of the lamp can affect the function of the occupancy sensor and might probably cause a faulty release.

## Installation to the side of walk direction

For an optimum occupancy detection, the sensor has to be mounted to the side of the detection range, so that the zones are cut as rectangular as possible. Installation places, where the detected objects move directly to the occupancy sensor, result in a considerably reduced coverage range.

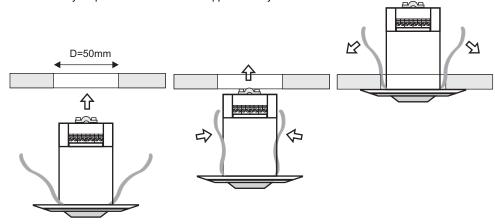
### Distance to sources of interferences

In order to avoid any faulty releases, sources of interferences such as heat radiators, lamps, air exits of air-conditioning systems etc. should be installed outside the detection range. In addition, direct sun radiation should be avoided.

## Indication for movement detection

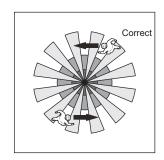
Movement detection is indicated by lighting of status LED for 2 seconds.

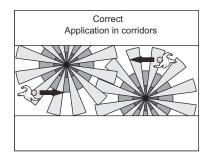
Notice: The behaviour of the status LED is independent of the current used delay time of the relay output. During reset of the device (power up) the status LED and the relay output are switched on for approximately 45 seconds.

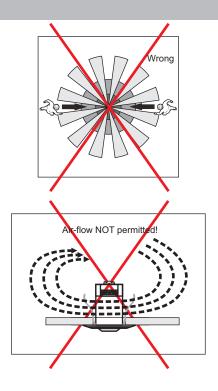




# Mounting advice (cont.)

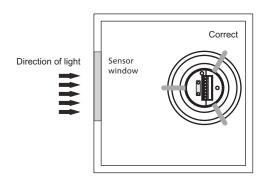


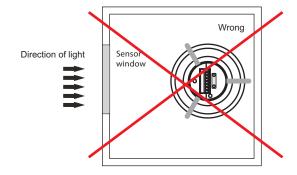




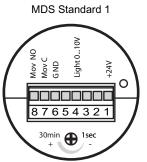
## Direction of internal light sensor

To have the highest accuracy for light measurement, please mount the sensor in the following way (see picture below).

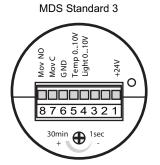




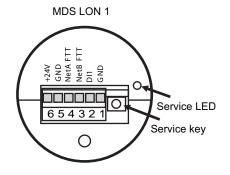
# **Terminal connection plan**



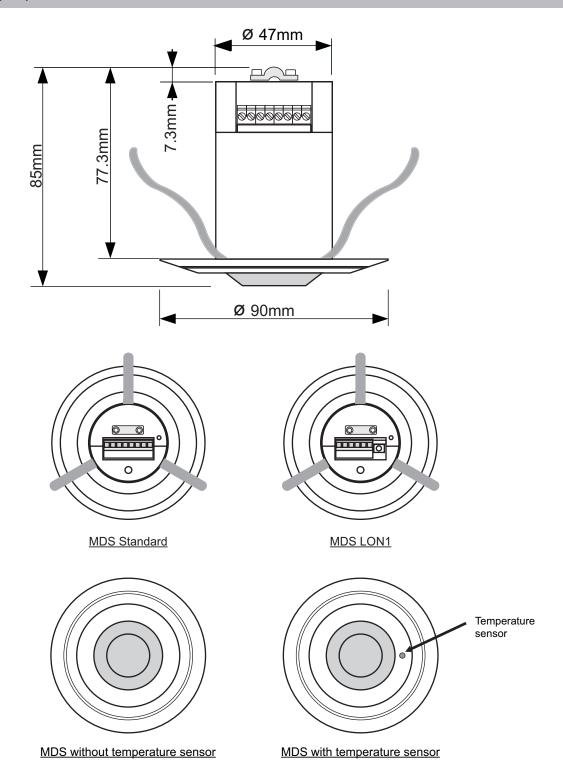
Variable delay time for movement detection range from 1s....30min



Variable delay time for movement detection range from 1s....30min









For pressure detection in liquid mediums for the air-conditioning, heating and water. Suitable for plants with refrigerant (R410A, R22, R134A).



# Types available

Type code	Description
EXT-TN-1071764	420mA, pressure range 01 bar, G1/4" male thread
EXT-TN-1071788	420mA, pressure range 02.5 bar, G1/4" male thread
EXT-TN-1071795	420mA, pressure range 04 bar, G1/4" male thread
EXT-TN-1071801	420mA, pressure range 06 bar, G1/4" male thread
EXT-TN-1066821	420mA, pressure range 010 bar, G1/4" male thread
EXT-TN-1066838	420mA, pressure range 016 bar, G1/4" male thread
EXT-TN-1071832	420mA, pressure range 025 bar, G1/4" male thread
EXT-TN-1066814	420mA, pressure range 040 bar, G1/4" male thread
EXT-TN-1071696	010V, pressure range 01 bar, G1/4" male thread
EXT-TN-1071702	010V, pressure range 02.5 bar, G1/4" male thread
EXT-TN-1071719	010V, pressure range 04 bar, G1/4" male thread
EXT-TN-1071726	010V, pressure range 06 bar, G1/4" male thread
EXT-TN-1071733	010V, pressure range 010 bar, G1/4" male thread
EXT-TN-1071740	010V, pressure range 016 bar, G1/4" male thread
EXT-TN-1071757	010V, pressure range 025 bar, G1/4" male thread

# Technical data

Standards	CE conformity	- 2004/108/EG Electromagnetic compatibility
		- 2001/95/EG Product safety
	EN conformity	- EN55022 and EN610004-3 EMV
		- EN61010-1 Product safety
	IEC conformity	- IEC68232 Resistance to shockproof
		- IEC68206 & IEC68236 Resistance to vibrations
General Data	Measuring element	Stainless steel diaphragm
	-	Poly-Si on SiO2 (thin-film resistor)
	Pressure type	Relative pressure
	Overload range	200% measuring range
	Bursting pressure	300% measuring range
	Pressure connector	G1/4" male thread
	Accurancy	Typical 0.7% full scale in the temperature range
	·	-2085°C
	Ambient temperature	-40+105°C
	Media temperature	-40+125°C
	Protection	IP65 according to EN60529
	Weight	90g
Type DLMx/A New	Operating voltage	DC 15-24V
-	Power consumption	Max. 0.5W
	Output	4-20mA, max load (UB-12V) / 20mA
Type DLMx/V_New	Operating voltage	DC 15-24V(±10%) / AC 24V(±10%)
-	Power consumption	Typical 0.15W / 0.3VA
	Output	0-10V, load min. 5kΩ
	·	



# Security advice /

The installation and assembly of electrical equipment may only be performed by an authorized and skilled electrician.

The modules must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people, animals or real value.

#### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device are valid. Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

The transducers must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

#### Mounting advice

- For connecting the device, the process lines must be unpressurized
- Note the suitability of the device for the medium to be measured
- Note the maximum pressures

#### Installation

A prerequisite for the operation is a proper installation of all electrical supply, control and sensing leads as well as the pressurized connection line.

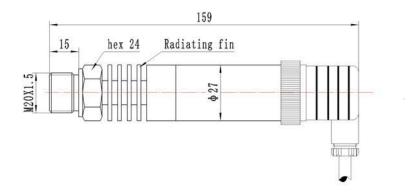
Before installing the device, the leak tightness of the pressurized connection lines must be inspected.

### Terminal connection plan

DLMx/V\_New 0...10V Type

1: Uv: DC 15-24V/ AC 24V 2: GND 3: Out: 0...10V : Shield DLMx/A\_New 4...20mA Type







Duct sensor for measuring relative humidity and temperature in gaseous media of heating, cooling and air-conditioning systems (e.g. in fresh air / exhaust air ducts). Designed for locking on control and display systems. Additionally, the device can be supplied with a passive temperature sensor e.g. PT100, PT1000, NTC10k etc.

**Standards** 

General data



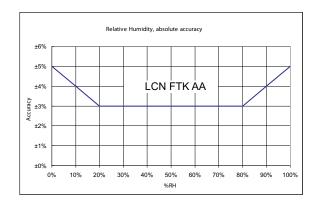
# Types available

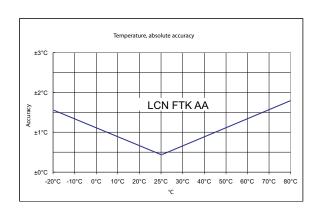
Type code	Туре	Description
EXT-TN-1072327	LCN-FTK140AS PT1000	Duct sensor 140mm, 420mA for humidity, PT1000
EXT-TN-1072303	LCN-FTK140AS NTC10k	Duct sensor 140mm, 420mA for humidity, NTC10k
EXT-TN-1072310	LCN-FTK140AS NTC10kPR	E Duct sensor 140mm, 420mA for humidity, NTC10k Precon
EXT-TN-1066722	LCN-FTK140AA	Duct sensor 140mm, 2x 420mA for humidity and temperature

# **Technical data**

CE conformity	- 2004/108/EG electromagnetic compatibility
	- 2001/95/EG Product safety
EN conformity	- EN60730-1:2002 EMC
	- EN60730-1:2002 Product safety
Power supply	DC 15-24V(±10%)
Power consumption	Max. 40mA
Measuring range	Humidity : 0100% RH
	Temperature : -20+80°C
Output	Humidity : 420mA, load<500Ω at DC 24\
	Temperature : 420mA, load<500Ω at DC 24\
	(Optional type AS: resistance NTC/PTC)
Clamps	Terminal screw max. 1.5mm <sup>2</sup>
Mounting length L	140mm
Sensor pipe	Material PA6, colour black
Filter element	Material stainless-steel, mesh size 80µm
Connection head	Material PA6, colour white
Protection	Connection head IP65
Cable entry	Single entry M16 for cable max. D=8mm
Ambient temperature	-20+70°C
Weight	120a

# Accuracy







# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

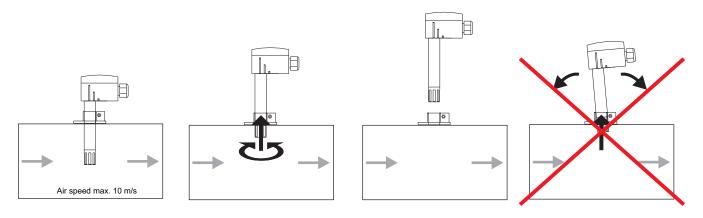
### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid. With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics. Due to the self heating, the wire current affects the accuracy of the measurement. Therefore it same should not exceed 1mA.

The devices must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

### **Mounting advice**

The sensor is directly mounted to the ventilation duct by means of a mounting flange or by screws.

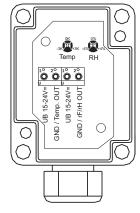


# **Application notice**

Due to air circulation dirt and dust particles can be piled up in the course of time on the sintered filter which is protecting the sensor. Thus, the function of the sensor can be affected. After having dismantled the filter, this can be cleaned by blowing it out with oil-free and filtered compressed air, super-clean air or nitrogen or by washing it out with distilled water. If the filter is too dirty, this should be replaced. Refrain from touching the sensitive humidity sensor. Any tampering will result in an expiration of the warranty.

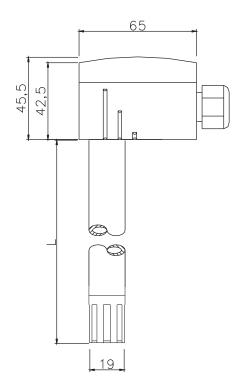
With normal environmental conditions we recommend a recalibration interval of around 1 year to maintain the indicated accuracy. At high ambient temperatures and high humidity, or when using the sensor in aggressive gases, an early recalibration or a change of the humidity sensor can become necessary. Such a recalibration or a probable sensor change do not come under the general warranty.

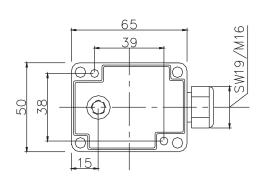
# **Terminal connection plan**



If only the humidity output is used, terminal "UB 15-24V= (Temp)" has to be bridged to "UB 15-24V= (rH/rF)", and terminal temperature output "GND/Temp. OUT 4-20mA" has to be bridged to "GND" of the power supply.









Duct sensor for measuring relative humidity and temperature in gaseous media of heating, cooling and air-conditioning systems (e.g. in fresh air / exhaust air ducts). Designed for locking on control and display systems. Additionally, the device can be supplied with a passive temperature sensor e.g. PT100, PT1000, NTC10k etc.

**Standards** 

**General data** 



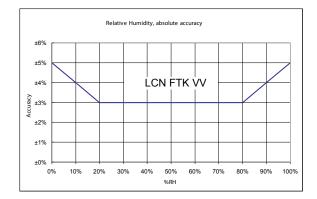
# Types available

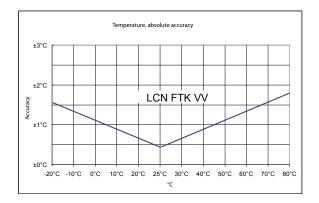
Type code	Туре	Description
EXT-TN-1072358	LCN-FTK140VS PT1000	Duct sensor 140mm, 010V for humidity, PT1000
EXT-TN-1072334	LCN-FTK140VS NTC10k	Duct sensor 140mm, 010V for humidity, NTC10k
EXT-TN-1072341	LCN-FTK140VS NTC10kPRI	E Duct sensor 140mm, 010V for humidity, NTC10k Precon
EXT-TN-1071283	LCN-FTK140VV	Duct sensor 140mm, 2x 010V for humidity and temperature
EXT-TN-1071290	LCN-FTK270VV	Duct sensor 270mm, 2x 010V for humidity and temperature

# **Technical data**

CE conformity	<ul> <li>- 2004/108/EG Electromagnetic compatibility</li> <li>- 2001/95/EG Product safety</li> </ul>
EN conformity	- EN60730-1:2002 EMC
,	- EN60730-1:2002 Product safety
Power supply	DC 15-24V / AC 24V(±10%)
Power consumption	Typical 0.5W / 1.7VA
Measuring range	Humidity : 0100% RH
	Temperature: -20+80°C
Output	Humidity : DC 010V, load min. 5kΩ
	Temperature : DC 010V, load min. 5kΩ
	(Optional type VS: resistance NTC/PTC,
	depending on sensor chosed)
Clamps	Terminal screw max. 1.5mm <sup>2</sup>
Mounting length L	140mm / 270mm
Sensor pipe	Material PA6, colour black
Filter element	Material stainless-steel, mesh size 80µm
Connection head	Material PA6, colour white
Protection	Connection head IP65
Cable entry	Single entry M16 for cable max. D=8mm
Ambient temperature	-20+70°C
Weight	120g

# Accuracy







# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

### **Electrical connection**

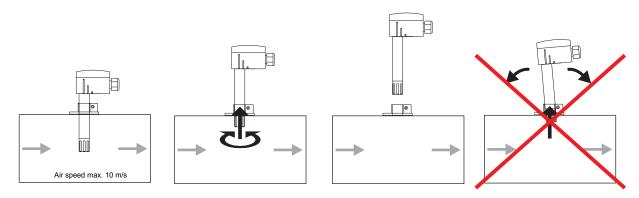
The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device are valid.

Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage (±0.2V).

When switching the supply voltage on/off, power surges must be avoided on site.

### **Mounting advice**

The sensor is directly mounted to the ventilation duct by means of a mounting flange or by screws.



### **Application notice**

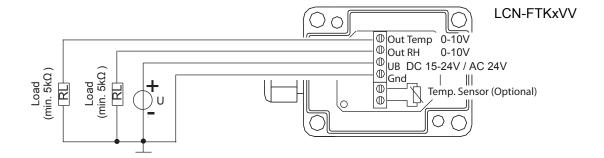
Due to air circulation dirt and dust particles can be piled up in the course of time on the internal filter which is protecting the sensor. Thus, the function of the sensor can be affected. After having dismantled the filter, this can be cleaned by blowing it out with oil-free and filtered compressed air, super-clean air or nitrogen or by washing it out with distilled water. If the filter is too dirty, this should be replaced.

Refrain from touching the sensitive humidity sensor. Any tampering will result in an expiration of the warranty.

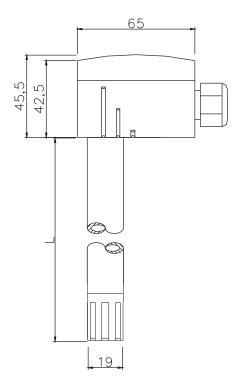
With normal environmental conditions we recommend a recalibration interval of around 1 year to maintain the indicated accuracy.

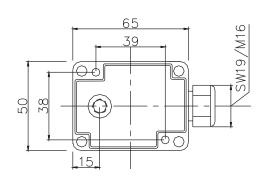
At high ambient temperatures and high humidity, or when using the sensor in aggressive gases, an early recalibration or a change of the humidity sensor can become necessary. Such a recalibration or a probable sensor change do not come under the general warranty.

#### **Terminal connection plan**











Combined sensor for measuring relative humidity and temperature in rooms (e.g. office or conference rooms). Designed for locked on control and display systems. Additionally, the device can be supplied with a passive temperature sensor, e.g. PT100, PT1000, NTC10k etc.





LCN-FTW04 AS/VS/VV

LCN-FTW04 LCD VV

# Types available

Type code	Туре	Description
EXT-TN-1072259	LCN-FTW04 AS PT1000	Humidity 420mA, temperature PT1000
EXT-TN-1072235	LCN-FTW04 AS NTC10k	Humidity 420mA, temperature NTC10k
EXT-TN-1072242	LCN-FTW04 AS NTC10kPRE	Humidity 420mA, temperature NTC10k Precon
EXT-TN-1072280	LCN-FTW04 VS PT1000	Humidity 010V, temperature PT1000
EXT-TN-1072266	LCN-FTW04 VS NTC10k	Humidity 010V, temperature NTC10k
EXT-TN-1072273	LCN-FTW04 VS NTC10kPRE	Humidity 010V, temperature NTC10k Precon
EXT-TN-1066739	LCN-FTW04 VV	Humidity 010V, temperature 010V
EXT-TN-1071337	LCN-FTW04 LCD VV	Humidity 010V, temperature 010V, with LCD display





LCN-FTW04

LCN-FTW04 LCD

# **Technical data**

Standards	CE conformity	<ul> <li>- 2004/108/EG Electromagnetic compatibility</li> <li>- 2001/95/EG Product safety</li> </ul>	
	EN conformity	- EN60730-1:2002 EMC - EN60730-1:2002 Product safety	
General data	Power supply	DC 15-24V (±10%) or AC 24V (±10%)	
Ochiciai data	Measuring range	Humidity: 0100% RH	
	Accuracy	Humidty: see diagram	
	Output	Relative humidity: 010, min. load 10kΩ	
	Clamps	Terminal screw max. 1.5mm <sup>2</sup>	
	Housing	For Wall mounting, Material ABS,colour white, similar to RAL9010	
	Protection	IP30 according to EN 60529	
	Cable entry	From behind or side-mounted entry from top or	
		below	
	Ambient temperature	-20+70°C	
	Weight	80g	
Type AS	Operating voltage	DC 15-24V (±10%)	
<b>3.</b>	Power consumption	Max. 20mA / DC 24V	
	Measuring current	Temperature: typical <1mA	
	Measuring element	Temperature: sensor according to customer's	
		request e.g. PTC, NTC	
	Measuring range	Temperature: depending on sensor used	
	Output	Relative humidity: 420mA, max. load 800Ω	
		Temperature: passive	
	Accuracy@21°C	Temperature: depending on sensor used	



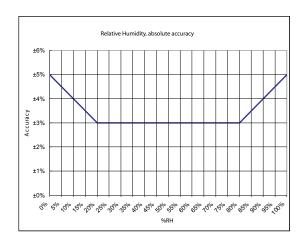
# **Technical data (Cont.)**

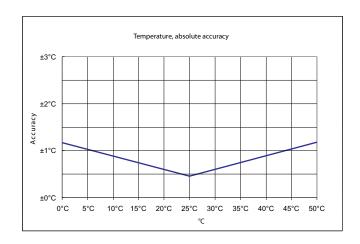
#### Type VS

Operating voltage	DC 15-24V (±10%) or AC 24V (±10%)
Power consumption	Typical 0.3W / 0.5VA
Measuring current	Temperature: typical <1mA
Measuring element	Temperature: sensor according to customer's
	request e.g. PTC, NTC
Measuring range	Temperature: depending on sensor used
Output	Relative humidity: 010V
	Temperature: passive
Accuracy@21°C	Temperature: depending on sensor used
Operating voltage	DC 15-24V (±10%) or AC 24V (±10%)
Power consumption	Typical 0.4W / 0.6VA
Measuring range	Temperature: -1535°C / 050°C
	(selectable via jumper)
LCD display	29mm x 12mm, colour black/white
Functions displayed	Relative humidity and/or temperature
	(selectable via jumper)
Output	Temperature: 010V, min. load 10kΩ
Accuracy@21°C	Temperature: see diagram

Type LCD VV

### Sensor accuracy





# **Security advice**

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

### **Electrical connection**

The devices are constructed for the operation of protective low voltage(SELV). For the electrical connection, the technical data of the corresponding device is valid.

Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

The transducers must be operated at a constant supply voltage(±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

### Mounting advice

The devices are supplied in an operational status. Installation is made by means of rawl plugs and screws (accessory) to the smooth wall surface. For wiring, the snap-on lid must be separated from the base plate.

Installation must be made on representative places for the room temperature, to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. If the device is mounted on standard flush box, the end of the installation tube in the flush box must be sealed, so as to avoid any draught in the tube falsifying the measuring result.



#### Location and accuracy of room sensors

Besides a suitable representative mounting place, corresponding to the room temperature, the accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important that the flush socket is completely closed at the wall side, so that the circulation of air may take place through the gaps in the cover. Otherwise deviations in temperature measurement will occur due to uncontrolled air circulation. Furthermore, the temperature sensor should not be covered by furnitures, etc. A mounting place next to doors (occurring draught) or windows (colder outside wall) should be avoided.

#### Surface and flush mounting

The temperature dynamics of the wall influence the measurement result of the sensor. Various wall types (brick, concrete, dividing and hollow brickwork) have different behaviour with regard to thermal variations. A solid concrete wall responds to thermal fluctuations within a room in a much slower way than a light-weight structure wall. Room temperature sensors installed in flush boxes, have a longer response time to thermal variations. In an extreme case, they detect the radiant heat of the wall even if the air temperature in the room is lower. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor, the smaller are the deviations limited in time.

### **Application note**

Refrain from touching the sensitive humidity sensor. Any tampering will result in an expiration of the warranty.

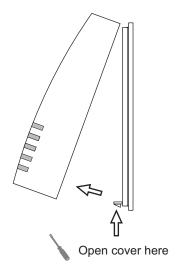
With normal environmental conditions we recommend a recalibration interval of around 1 year to maintain the indicated accuracy.

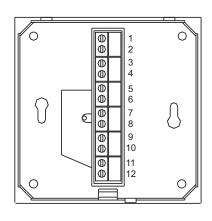
At high ambient temperatures and high humidity, or when using the sensor in aggressive gases, an early recalibration or a change of the humidity sensor can become necessary. Such a recalibration or a probable sensor change do not come under the general warranty.

#### Build up of self heating by electrical dissipated power

Room temperature sensors with electronic components always have a dissipated power, which affects the temperature measurement of the ambient air. The dissipation in active temperature sensors shows a linear increase with rising operating voltage. This dissipated power has to be considered when measuring temperature. In case of a fixed operating voltage(±0.2V), this is normally done by adding or reducing a constant offset value. As transducers work with a variable operating voltage, only one operating voltage can be taken into consideration, for reasons of production engineering. Transducers 0...10V / 4...20mA have a standard setting at an operating voltage of DC 24V. Therefore at this voltage, the expected measuring error of the output signal will be the least. As for other operating voltages, the offset error will be increased or lowered by a changing power loss of the sensor electronics. If a re-cablibration should become necessary later directly on the sensor, this can be done by means of a trimming potentiometer on the sensor board (For sensors with LON-interface, a re-calibration can be done via corresponding software variable SNVT). Remark: Occurred draft leads to a better carrying-off of dissipated power at the sensor. Thus, temporal limited fluctuations might occur upon temperature measurement.

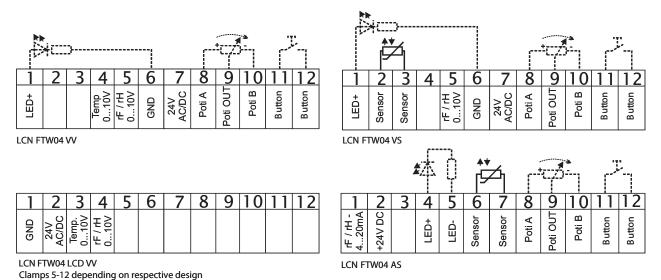
### **Terminal connection plan**





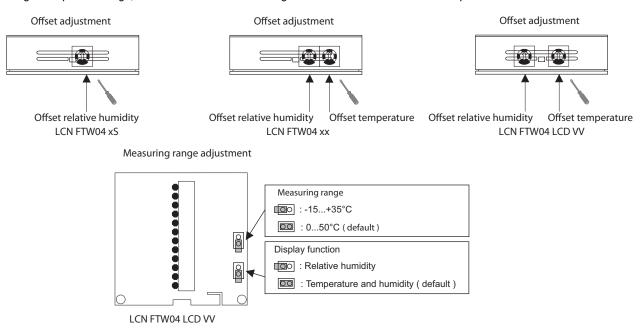


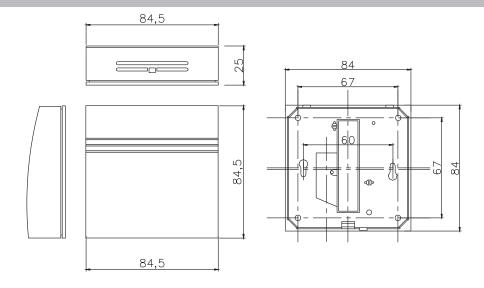
# Terminal connection plan (Cont.)



•

Depending on respective design, the device has a different configuration of terminals. The connection plan attached to each device is valid.







The sensor with display is designed for humidity/temperature detection and integrated manual control of HVAC applications (change set point, hange occupancy, change fan speed).

The operating functions can be used very flexibly depending on the room requirements. Thus, different types with various numbers of function keys are available.

The sensor has a RS485 MODBUS communication interface, by which the functions of the operating keys respectively the status LED can be inquired or controlled.

The device disposes of the following features:

- Different function keys depending on the device type, e.g. for set point or occupancy or fan speed adjustment
- LCD display for indication of room temperature or relative humidity
- LED for status indication
- Integrated temperature sensor
- For surface-mounting, mounting on standard installation box possible



### Types available

Type code Type Description

**Standards** 

General data

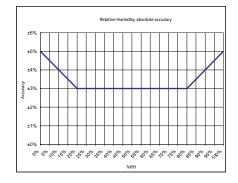
EXT-TN-1071344 LCN-FTW04 MODBUS 2 analgoue output, MODBUS

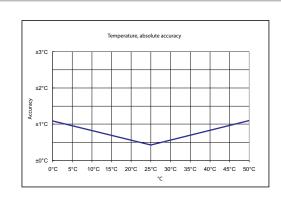
EXT-TN-1072730 LCN-FTW04 LCD MODBUS 2 analgoue output, MODBUS, with LCD display

# **Technical data**

CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> <li>2001/95/EG Product safety</li> </ul>
EN conformity	- EN60730-1:2002 EMC
<b>,</b>	- EN60730-1:2002 Product safety
Power supply	DC 15-24V(±10%) or AC 24V(±10%)
Power consumption	Typical 0.4W / 0.6VA
Measuring range	050°C
Interface	RS485, baud rate, transmission method, parity
	configurable (see DIP switch configuration)
	Mode half duplex, internal bus terminating
	resistor
Inputs	2 digital inputs, dry contact, max. wire length
	10m
LCD display	29mm x 12mm, colour black / white
	(On corresponding model only)
Functions display	Relative humidity or relative humidity and
	temperature
	(selectable via configuration register)
	(On corresponding model only)
Clamps	Terminal screws, max. 1.5mm <sup>2</sup>
Enclosure	For wall mounting, material ASA, colour pure
	white, similar to RAL9010
Protection	IP30 according to EN60529
Cable entry	From behind or side mounted entry from top /
	bottom
Ambient temperature	-3070°C
Transport	-3070°C / max. 85% RH, non-condensing
Weight	95g

# Accuracy







# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

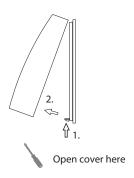
Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring nd points. The ambient temperature of the transducer electronics should be kept constant.

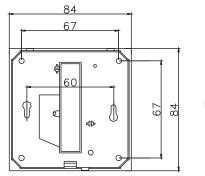
The transducers must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

### **Mounting advice**

The devices are supplied in an operational status. Installation is made by means of rawl plugs and screws (accessory) to the smooth wall surface. For wiring, the snap-on lid must be separated from the base plate.

Installation must be made on representative places for the room temperature, to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. If the device is mounted on standard flush box, the end of the installation tube in the flush box must be sealed, so as to avoid any draught in the tube falsifying the measuring result.





Base plate

### Location and accuracy of room sensor

Besides a suitable representative mounting place, corresponding to the room temperature, the accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important that the flush socket is completely closed at the wall side, so that the circulation of air may take place through the gaps in the cover. Otherwise, deviations in temperature measurement will occur due to uncontrolled air circulation. Furthermore, the temperature sensor should not be covered by furnitures, etc. A mounting place next to doors (occurring draught) or windows (colder outside wall) should be avoided.

### Surface and flush mounting

The temperature dynamics of the wall influence the measurement result of the sensor. Various wall types (brick, concrete, dividing and hollow brickwork) have different behaviour with regard to thermal variations. A solid concrete wall responds to thermal fluctuations within a room in a much slower way than a light-weight structure wall. Room temperature sensors installed in flush boxes, have a longer response time to thermal variations. In an extreme case, they detect the radiant heat of the wall even if the air temperature in the room is lower. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor, the smaller are the deviations limited in time.

### **Application notice**

Refrain from touching the sensitive humidity sensor. Any tampering will result in an expiration of the warranty.

With normal environmental conditions we recommend a recalibration interval of around 1 year to maintain the indicated accuracy.

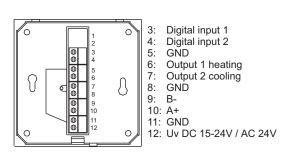
At high ambient temperature and high humidity, or when using the sensor in aggressive gases, an early recalibration or a change of the humidity sensor can become necessary. Such a recalibration or a probable sensor change do not come under the general warranty.

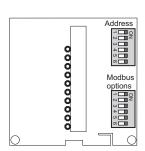


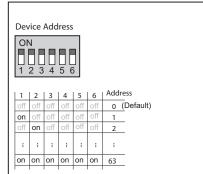
### Build up of self heating by electrical dissipated power

Room temperature sensors with electronic components always have a dissipated power, which affects the temperature measurement of the ambient air. The dissipation in active temperature sensors shows a linear increase with rising operating voltage. This dissipated power has to be considered when measuring temperature. In case of a fixed operating voltage (±0.2V), this is normally done by adding or reducing a constant offset value. As transducers work with a variable operating voltage, only one operating voltage can be taken into consideration, for reasons of production engineering. Transducers 0...10V / 4...20mA have a standard setting at an operating voltage of DC 24V. Therefore at this voltage, the expected measuring error of the output signal will be the least. As for other operating voltages, the offset error will be increased or lowered by a changing power loss of the sensor electronics. If a re-cablibration should become necessary later directly on the sensor, this can be done by means of a trimming potentiometer on the sensor board (For sensors with LON-interface, a re-calibration can be done via corresponding software variable SNVT). Remark: Occurred draft leads to a better carrying-off of dissipated power at the sensor. Thus, temporal limited fluctuations might occur upon temperature measurement.

# Terminal connection plan







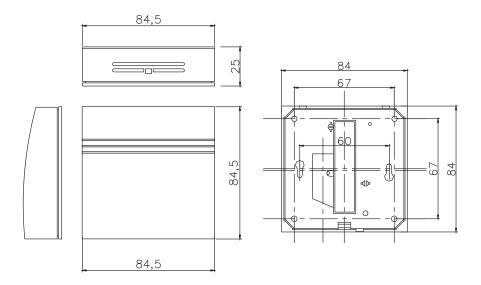


1	Mod	e
off	RTU	(Default)
on	ASCI	

2	3	Baud		
off	off	9600	(Default)	default
on	off	19200		
off	on	38400		
on	on	57600		

t	4	5	Parity
	on	off	even (Default)
	off	on	odd
	off	off	no

6	Termination
off	inactive (Default)
on	120Ohm





Sensor for light measurement in rooms and offices (model Li04, specially for wall mounting) or in outdoor areas (model Li65). Designed for locking on control and display systems. The sensors have an integrated colour filter (green filter) which is adapted to the sensitivity of human eyes.





# Types available

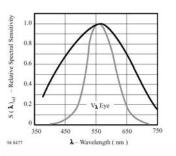
Type code	Туре	Description
EXT-TN-1072365	Li04 V	Room light sensor, 010V
EXT-TN-1071528	Li65 A	Outdoor light sensor, 420mA
EXT-TN-1071511	Li65 V	Outdoor light sensor, 010V

### **Technical data**

Standards	CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> <li>2001/95/EG Product safety</li> </ul>
	EN conformity	- EN60730-1:2002 EMC
	,	- EN60730-1:2002 Product safety
General data	Measuring element	BPW21
	Accuracy	Typical 5% of measuring range
	Housing	- LI04 : ABS, colour white similar to RAL9010
		- LI65 : Polyamide, colour white
	Ambient temperature	-20 +70°C
	Storage temperature	-20 +70°C / max. 85% RH, non-condensing
	Protection	<ul> <li>Li04: IP30 according to EN60529</li> </ul>
		- Li65 : IP65 according to EN60529
Type A	Operating voltage	DC 15-24V(±10%)
	Power consumption	Max. 20mA
	Measuring range	1 : Max. 2kLux
		2 : Max. 20kLux
		3 : Max. 100kLux
	Output	420mA, max. load 500Ω
	Clamps	2 pole (two wire), terminal strip max. 1.5mm <sup>2</sup>
	Cable entry	Li65 : Single entry, M20 for wire conductor
	- NA - 1 - 1	D=8mm
	Weight	- Li04 : 80g
	Operating voltage	- Li65 : 100g
Type V	Power consumption	DC 15-24V(±10%) or AC 24V(±10%)
	Measuring range	Power consumption : Typical 0.15W / 0.5VA  1 : Max. 2kLux
	Wedsumg range	2 : Max. 2kLux
		3 : Max. 100kLux
	Output	010V, min. load 5kΩ
	Clamps	3 pole (three wire), terminal strip max. 1.5mm <sup>2</sup>
	Cable entry	Li65 : Single entry, M20 for wire conductor
	Sabis only	D=8mm
	Weight	- Li04 : 80g
		- Li65 : 100g
		2.50 . 100g

#### Remarks

<sup>1.)</sup> Sensitivity of sensor without prism. Adjustable by means of DIP-switch on the transducer. 2.) Accuracy of transducer without prism. Manufacturer's calibration is made in the 2kLux range. Operating voltage DC 24V and 21°C (±5K) ambient temperature. Please take care that the transducer should generally be operated in the measuring range centre, as increased deviations could occur on the measuring range end points. In addition the ambient temperature of the transducer electronics should be kept constant.





# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

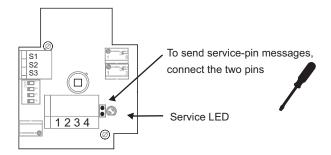
With regard to passive sensors (e.g. PT100 etc.) in 2-wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics.

Due to the self-heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

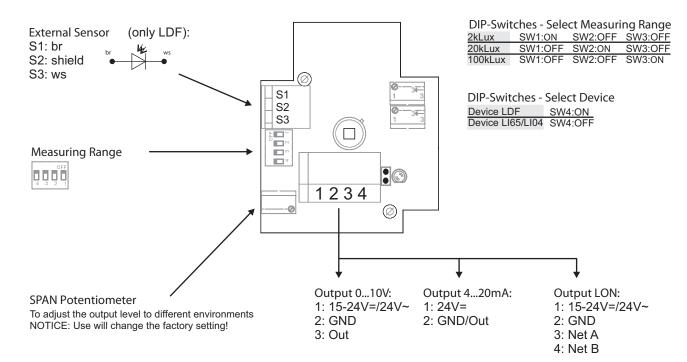
Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

### **Mounting advice**

The sensor is fixed by means of screws. With LI04, an installation on standard ISO boxes is possible. Tightening material is not included in delivery range.



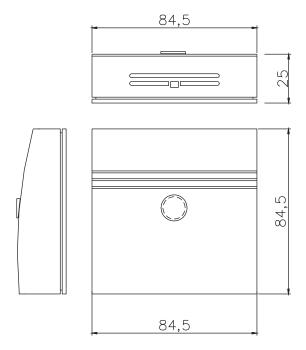
# Terminal connection plan



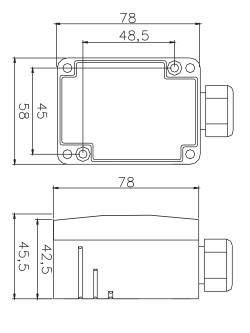


# Dimensions (mm)

Li04 V



Li65 A / V





The mixed gas sensor is designed for the detection of air quality in living spaces. If the detected air quality is bad, the output of the sensor will rise to 10V.

Mixed gas sensors detect gases and vapours which can be oxidised (burnt): body odours, tobacco smoke, exhalations emitted by materials (furniture, carpets, paint, glue, etc.). In practice it has been proved that these devices indicate air quality which is detectable by the sensors. They have well proved themselves over the past years in a variety of applications.

#### Measuring principle

A heated tin dioxide semi-conductor sensor varies its conductivity proportional to the number of molecules of reducing gases and thus amplifies the connected output voltage of the measuring element of DC 0V to 10V. The following particles and gases are detected:

Portions of cigarette smoke, hydrogen, carbon monoxide, ethanol and ammonia.

Contrary to CO2 sensors which measure concentration of a type of gas in a selective mode, the mixed gas sensors are wider band, i.e. the sensor signal neither shows the type of gas nor the concentration in ppm. Due to the complex and ever changing composition of ambient air it is desirable that the air quality measurement of the sensor would be broadband.







### Types available

Type code	Туре	Description
EXT-TN-1071481	LK130 V	Duct air quality sensor, 010V, mounting length 130mm
EXT-TN-1072389	LK260 V	Duct air quality sensor, 010V, mounting length 260mm
EXT-TN-1066654	LW04 V	Room air quality sensor, 010V

# Technical data

Standards	CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> <li>2001/95/EG Product safety</li> </ul>
	EN conformity	- EN60730-1:2002 EMC - EN60730-1:2002 Product safety
General data	Power supply	DC 15-24V (±10%) / AC 24V (±10%)
	Clamps	Terminal screw, max. 1.5mm <sup>2</sup>
	Sensor	VOC = volatile organic compound (mixed gas)
	Warm up time	Approximately 30 minutes
	Housing	- LW04
		Material ABS ASA, colour pure white
		- LKx
		Material PA6.6, colour pure white (head)
		Material PVC, colour black (bushing)
	Housing protection	IP20 according to EN60529
	Ambient temperature	20+50°C, max. 85% RH non-condensing
Type LW04 V	Power consumption	1.2W / 2.2VA
	Output	010V, load min. 10kΩ
	Weight	65g
Type LKx V	Power consumption	1.2W / 2.2 VA
	Output	010V, load min. 10kΩ
	Weight	150g

# Security advice <u>M</u>

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.



### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

The transducers must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

#### **Mounting advice**

The devices are supplied in an operational status.

Installation is made by means of rawl plugs and screws (accessory) to the smooth wall surface. Model LKx can either be mounted to the air duct by means of a mounting flange or by screws. Attention: It is absolutely necessary to install the type LKx (Duct Sensors) in a way that the air inlet is opposite to the flow direction in the duct. For model LW04, mounting on standard ISO boxes is possible. Tightening material is not included in delivery range.

For wiring, the snap-on lid must be separated from the base plate. For wiring model LKx (duct sensor), the cover of the terminal box must be opened.

Installation must be made on representative places for the air-quality, to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. If the device is mounted on standard flush box, the end of the installation tube in the flush box must be sealed, so as to avoid any draught in the tube falsifying the measuring result.

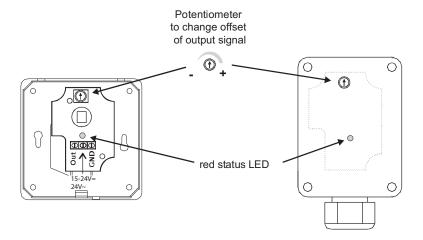
The sensor cannot distinguish pleasant from unpleasant smells. The final adjustment whether air quality is satisfactory or not must be made by the people living or working in the room. Moreover, various air compositions occur in different rooms.

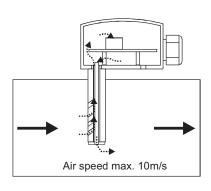
Therefore the set point for the desired air quality is adjusted provisional upon production. Optimisation must be done by the users of the rooms, according to their personal feeling.

The individual adaption of the output signal is made via a trimming potentiometer on the sensor board. By means of the potentiometer, the offset of the output signal is increased or lowered.

#### Installation procedure

- Connect sensor and switch operating voltage on.
   In case of duct sensor: close the cover of the connection head!
- 2. Ensure good air conditions close to the sensor.
- 3. The output signal has to be verified after an operating time of approximately 30 minutes. The voltage level should lie in the range 13V. Please correct a too high/too low voltage level by means of the trimming potentiometer on the circuit board: the potentiometer should be turned to the left until the red LED is almost extinguished. Now, the output signal amounts to approximately 0.7V.
- 4. The sensor is ready for operation. The operating voltage of the output signal increases upon air quality changes for the worse.

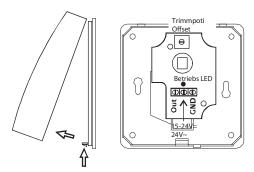




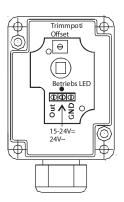


# **Terminal connection plan**

# LW04 V

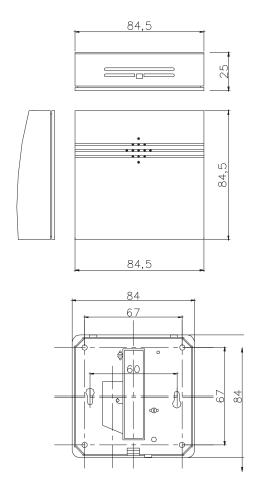


# LKx V

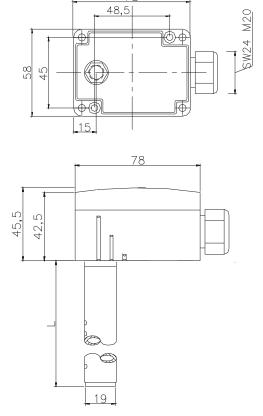


# Dimensions (mm)

# LW04 V



# LKx V



78



Electronic differential pressure switch for monitoring the differential pressure of air and other non-flammable and non-aggressive gases. Monitoring of air filters, fans, industrial cooling air cycles as well as over heating protection, control of air and fire dampers, anti-freeze with heat exchangers.



### Types available

Type code Type Description

EXT-TN-1071658 DPI2500 0...10V and relay, pressure range 0...2500Pa

EXT-TN-1072426 MKS100 Metal duct connector, L=100mm (2 pieces necessary per device)

### **Technical data**

#### **Standards**

#### **General Data**

CE conformity	- 89/336/EEC EMC directive
•	- 2002/95/EEC RoHS directive
Power supply	DC 24V / AC 24V ±10%
Current consumption	Max. 80mA@DC 24V
Output	010V, load min. 1kΩ
Material	Housing and cover : ABS / PC
Tubing	PVC, soft
Pressure connection	Male, D=5mm / 6.3mm
Electrical connection	Screwing terminals, max. 1.5mm <sup>2</sup>
Cable entry	M16 and M20
Dimensions LxWxH	89 x 86.5 x 37.1mm
Bursting pressure	30kPa
Accuracy % full scale	±1.5%
Long term stability	Typical <= ±1Pa / year
Media	Air and non-aggressive gases
Ambient temperature	-5+50°C, max. 95% RH, non-condensing
Storage temperature	-2070°C
Protection	IP54 according to EN60529
Weight	150g
Relay output	1x relay output (max. DC 30V / AC 250V / 6A)

# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

When switching the supply voltage on/off, power surges must be avoided on site.

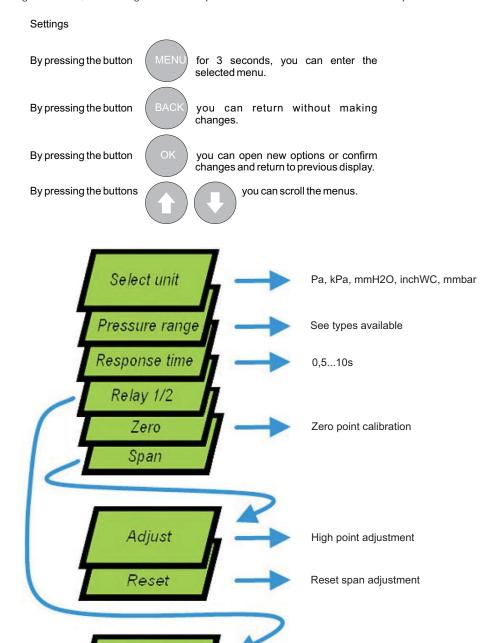
# **Mounting advice**

- For connecting the device, the process lines must be unpressurised.
- Note the suitability of the device for the medium to be measured.
- Note the maximum pressure.



# Installation

A pre-requisite for the operation is a proper installation of all electrical supply, control and sensing leads as well as the pressurised connection line. Before installing the device, the leak tightness of the pressurised connection lines must be inspected.





# Zero point calibration

#### Note!

Supply voltage must be connected one hour before the zero point calibration is carried out.

- 1) Disconnect both tubes from the pressure inlets + and -.
- 2) Push both arrow buttons or select "Zero" from the menu. Green LED turns off and "Zero" text followed by a counter from 3 to 0 seconds is displayed.
- 3) Wait until the green LED turns on again and then connect the tubes back to the pressure inlets.
- It is recommended to adjust the zero point every 12 months during normal operation.

# Span adjustment

#### Note!

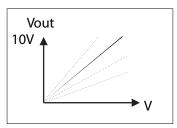
Supply voltage should be connected one hour before the span point adjustment is carried out.

Span point must not be adjusted without input pressure.

If the span point is adjusted with 0Pa or close to 0Pa input pressure the device may lose its accuracy and will not give out correct readings. In this case go to menu and select "Span" and then "Reset". This resets the span adjustment.

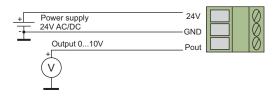
To adjust the span you need an accurate reference meter. Follow these steps to correctly adjust the span:

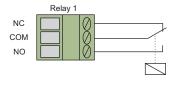
- 1) Set the zero point.
- 2) Connect the input pressure.
- 3) From the menu select "Span", and then "Adjust".
- 4) Adjust the display or 0...10V value to match the reference meter's value using the arrow buttons and confirm by pressing OK.



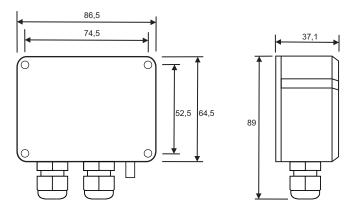
How span adjustment affects the measurement

# Terminal connection plan





The supply cable and control cable for relay must be separate, if non SELV voltage is used in relay contacts. Both of the cables have their own cable entry.





DPT Flow is a device for monitoring and controlling the air flow and for measuring flow rate of centrifugal fans. The flow rate measurement is based on differential pressure values measured directly from the fan. DPT Flow can be used to display the flow value on-site and to send the output value to a control system.



### Types available

Type code Type Description

EXT-TN-1071665 DPT Flow-D-1000 0...10V, pressure range 0...1000Pa, with LCD display

EXT-TN-1072426 MKS100 Metal duct connector, L=100mm (2 pieces necessary per device)

### **Technical data**

**Standards** 

#### **General Data**

CE conformity	<ul> <li>2004/108/EEC EMC directive</li> </ul>
,	- 2002/95/EEC RoHS directive
Power supply	DC 24V / AC 24V(±10%)
Power consumption	Max. 1W
Output	010V, load min. 1kΩ
Material	- Housing : ABS
	- Tubing : PVC, soft
Pressure connection	Male, D=5mm/6.3mm
Electrical connection	Screwing terminals, max. 1.5mm <sup>2</sup>
Cable entry	M16
Dimensions LxWxH	90 x 71.5 x 36mm
Bursting pressure	50kPa
Max. pressure	25kPa
Accuracy	±5Pa + ±1.5% from reading
Long term stability	Typical <= ±1Pa / year
Media	Air and non-aggressive gases
Ambient temperature	-5+50°C, max. 95% RH, non-condensing
Storage temperature	-2070°C
Protection	IP54 according to EN60529
Weight	150g

# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people, animals or real value.

### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant.

The transducers must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

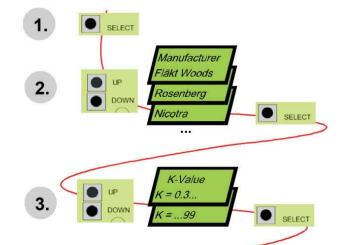
# **Mounting advice**

- For connecting the device, the process lines must be unpressurised.
- Note the suitability of the device for the medium to be measured.
- Note the maximum pressures.

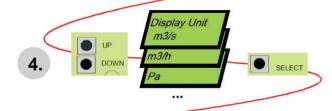


### Installation

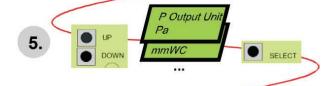
A pre-requisite for the operation is a proper installation of all electrical supply, control and sensing leads as well as the pressurised connection line. Before installing the device, the leak tightness of the pressurised connection lines must be inspected.



- 1. Press Select for > 2 seconds to start the menu.
- 2. Selection of the manufacturer of FAN.
- 3. Each fan has its own specific K-value. Please see the right K-value from the datasheet of the fan.

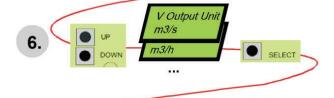


4. Display unit m3/s, m3/h, cfm, l/s, scfh, lpm, kPa, mbar, mmWC, inchWC or Pa.

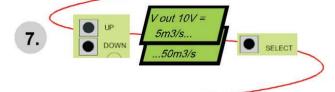


5. Pressure output unit (and P output scale).

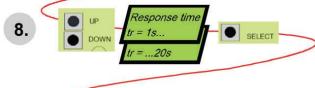
DPT Flow-1000
01000 Pa
01 kPa
010 mbar
0100 mmWC
04 inchWC



6. Flow output unit for defining the V output scale.



7. Vout scale, selectable.



- 8. Stepless response time selection (1s ... 20s).
- 9. Select END SELECT
- 9. Press Select and the device returns to the normal measuring mode.



# Zero point calibration

Auto zero element makes the DPT Flow meter maintenance free. Element automatically adjusts the transmitters zero point from time to time, this eliminates the zero point long term drift of the piezoresistive sensing element. During zero point adjustment the output and display values will freeze to the latest measured value. The automatic zero point adjustment takes 4 seconds. Zero point calibration is carried out every 10 minutes normally and during warm up the time is shorter a few times.

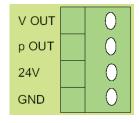
# **Terminal connection plan**

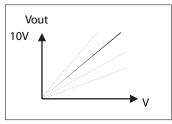
 V OUT
 Output 0...10V

 p OUT
 Output 0...10V

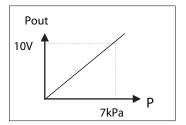
 24V
 Supply 24V AC/DC

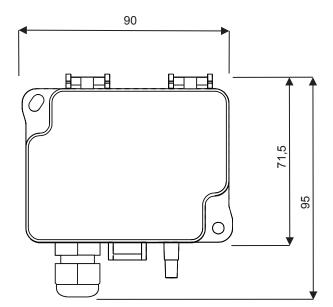
 GND
 Ground

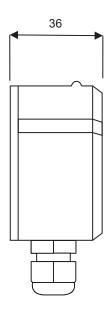




Vout scale can be changed









Adjustable differential pressure transmitter DPT for monitoring the differential pressure of air and other non-flammable and non-aggressive gases.

Possible applications: monitoring of air filters, fans, industrial cooling air cycles as well as overheating protection, control of air and fire dampers, anti-freeze with heat exchangers.





# Types available

Type code	Туре	Description
EXT-TN-1066777	DPT2500-R8	420mA or 010V output, measuring range adjustable, max. 2500Pa
EXT-TN-1071641	DPT2500-R8-D	420mA or 010V output, measuring range adjustable, max. 2500Pa, LCD
EXT-TN-1066791	DPT7000-R8	420mA or 010V output, measuring range adjustable, max. 7000Pa
EXT-TN-1066807	DPT7000-R8-D	420mA or 010V output, measuring range adjustable, max. 7000Pa, LCD
EXT-TN-1072426	MKS100	Metal duct connector, L=100mm (2 pieces necessary per device)

### **Technical data**

Standards	CE conformity	<ul> <li>2004/108/EG Electromagnetic compatibility</li> </ul>
		- 2001/95/EG Product safety
	EN conformity	- EN60730-1:2002 EMC
		- EN60730-1:2002 Product safety
General data	Power supply	DC 24V / AC 24V(±10%)
	Power consumption	Max. 1W
	Output	$010V$ , load min. $1k\Omega$ or
		420mA, load max. 500Ω
	Response time	0.8 or 4 sec. (selectable at the device)
	Material	- Housing : ABS
		- Cover : PC
		- Pressure connection: ABS
	Pressure connection	Male, D=5mm / 6,3mm
	Electrical connection	Screwing terminals, max. 1.5mm <sup>2</sup>
		Cable entry M16
	Dimensions LxWxH	90 x 71.5 x 36 mm
	Measuring element	Piezoresistive
	Bursting pressure	30kPa (model 2500), 80kPa (model 7000)
	Accuracy	±1.5% or (±6Pa <250Pa)
	Media	Air and non-aggressive gases
	Ambient temperature	-10+50°C, max. 95% RH, non-condensing
	Storage temperature	-2070°C
	Protection	IP54 according to EN 60529
	Weight	150g
Type DPT2500-R8 (-D)	Measuring range	-100+100Pa / 0100Pa / 0250Pa /
. ,		0500Pa / 01000Pa / 01500Pa /
		02000Pa / 02500Pa
		(selectable at the device)
Type DPT7000-R8 (-D)	Measuring range	01000Pa / 01500Pa / 02000Pa /
. ,		02500Pa / 03000Pa / 04000Pa /
		05000Pa / 07000Pa
		(selectable at the device)

# Security advice <u></u>

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

# Mounting advice

- For connecting the device, the process lines must be unpressurised.
- Note the suitability of the device for the medium to be measured.
- Note the maximum pressures.



### Installation

A prerequisite for the operation is a proper installation of all electrical supply, control and sensing leads as well as the pressurised connection line.

Before installing the device, the leak tightness of the pressurised connection lines must be inspected.

# Zero-point calibration

#### Note!

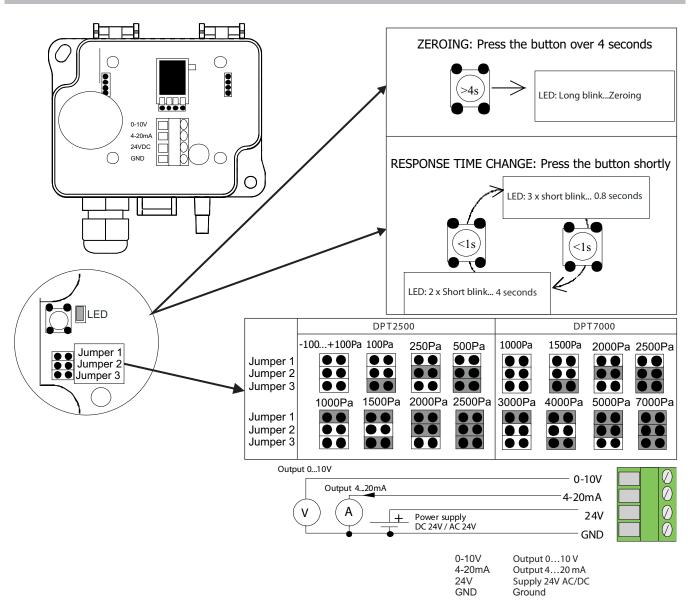
Supply voltage must be connected one hour before the zero-point calibration is carried out.

- Release both tubes from the pressure inlets + and -
- Push zero button until the red led turns ON.
- Wait until LED turns off and then install tubes again to the pressure inlets.

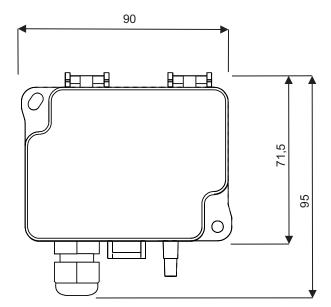
During normal operation it is recommended to calibrate the zero point every 12 months.

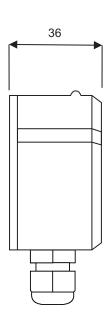
If the transmitter is equipped with automatic zero-point calibration the manual calibration is not required.

#### Terminal connection plan











Combined sensor for measuring relative humidity and temperature in rooms (e.g. office or conference rooms). Designed for locking on control and display systems. Additionally, the device can be supplied with a passive temperature sensor e.g. PT100, PT1000, NTC10k etc.



# Types available

Type code Type Description

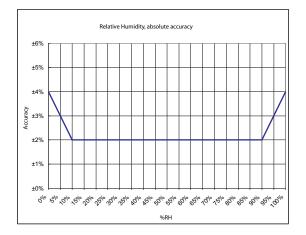
EXT-TN-1066715 FTW04 AS PT1000 - 4...20mA, humidity

- PT1000, temperature

# **Technical data**

Standards	CE conformity	- 2004/108/EEC EMC directive
		- 2001/95/EG Product safety
	EN conformity	- EN60730-1:2002 EMC
		- EN60730-1:2002 Product safety
General Data	Measuring range	Relative humidity: 0100%
	_ Accuracy	Relative humidity: refer to diagram below
	Clamps	Terminal screw max. 1.5mm <sup>2</sup>
	Housing	ABS, colour white similar to RAL 9010
	Protection	Connection head IP20 according to EN60529
	Cable entry	From behind or side-mounted entry from top /
		below
	Ambient temperature	-20+60°C
	Weight	80g
Type AS	Operating voltage	DC 15-24V(±10%)
• •	Power consumption	Max. 20mA / DC 24V
	Measuring current	Temperature: typical <1mA
	Measuring element	Temperature sensor according to customer's
	-	request
	Measuring range	Depending on sensor used
	Output	Relative humidity: 420mA, max. load 800Ω
	•	Temperature : passive
	Accuracy@21°C	Temperature : depending on sensor used

# Accuracy





# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid. With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics. Due to the self heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

The devices must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

### **Mounting advice**

The devices are supplied in an operational status. Installation is made by means of rawl plugs and screws (accessory) to the smooth wall surface. For wiring, the snap-on lid must be separated from the base plate.

Installation must be made on representative places for the room temperature, to avoid a falsification of the measuring result. Solar radiation and draught should be avoided. If the device is mounted on standard flush box, the end of the installation tube in the flush box must be sealed, so as to avoid any draught in the tube falsifying the measuring result.

#### **Application notice**

Refrain from touching the sensitive humidity sensor. Any tampering will result in an expiration of the warranty.

With normal environmental conditions we recommend a recalibration interval of around 1 year to maintain the indicated accuracy.

At high ambient temperature and high humidity, or when using the sensor in aggressive gases, an early recalibration or a change of the humidity sensor can become necessary. Such a recalibration or a probable sensor change do not come under the general warranty.

### Location and accuracy of room sensor

Besides a suitable representative mounting place, corresponding to the room temperature, the accuracy of the temperature measurement also depends directly on the temperature dynamics of the wall. It is important that the flush socket is completely closed at the wall side, so that the circulation of air may take place through the gaps in the cover. Otherwise, deviations in temperature measurement will occur due to uncontrolled air circulation. Furthermore, the temperature sensor should not be covered by furnitures, etc. A mounting place next to doors (occurring draught) or windows (colder outside wall) should be avoided.

#### Surface and flush mounting

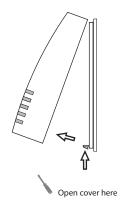
The temperature dynamics of the wall influence the measurement result of the sensor. Various wall types (brick, concrete, dividing and hollow brickwork) have different behaviour with regard to thermal variations. A solid concrete wall responds to thermal fluctuations within a room in a much slower way than a light-weight structure wall. Room temperature sensors installed in flush boxes have a longer response time to thermal variations. In an extreme case, they detect the radiant heat of the wall even if the air temperature in the room is lower. The quicker the dynamics of the wall (temperature acceptance of the wall) or the longer the selected inquiry interval of the temperature sensor, the smaller are the deviations limited in time.

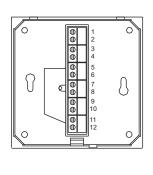
#### Build up of self heating by electrical dissipated power

Room temperature sensors with electronic components always have a dissipated power, which affects the temperature measurement of the ambient air. The dissipation in active temperature sensors shows a linear increase with rising operating voltage. This dissipated power has to be considered when measuring temperature. In case of a fixed operating voltage (±0.2V), this is normally done by adding or reducing a constant offset value. As the transducers work with a variable operating voltage, only one operating voltage can be taken into consideration, for reasons of production engineering. Transducers 0-10V / 4-20mA have a standard setting at a operating voltage of DC 24V. Therefore at this voltage, the expected measuring error of the output signal will be the least. As for other operating voltages, the offset error will be increased or lowered by a changing power loss of the sensor electronics. If a re-cablibration should become necessary later directly on the sensor, this can be done by means of a trimming potentiometer on the sensor board. Remark: Occurred draft leads to a better carrying-off of dissipated power at the sensor. Thus, temporal limited fluctuations might occur upon temperature measurement.



# **Terminal connection plan**

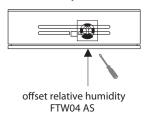


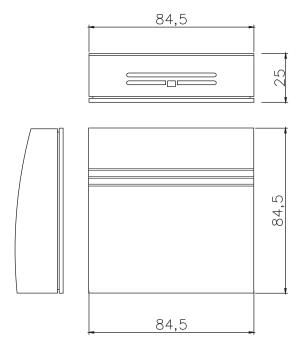


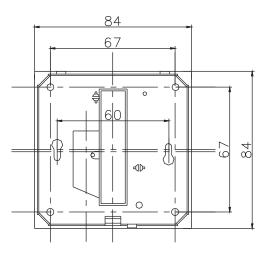
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1	2	3	4	5	6	7	8	9	10	11	12
rF / rH - 420mA	+24V DC		LED+	LED-	Sensor	Sensor	Poti A	Poti OUT	Poti B	Button	Button

FTW04 AS











Sensor for measuring relative humidity (model LC-FA54) and sensor for measuring relative humidity and temperature (model LC-FTA54) in outdoor areas. Designed for locking on control and display systems.



# Types available

Type code	Туре	Description
EXT-TN-1072167	LC-FA54 V	Humidity output 010V
EXT-TN-1072198	LC-FTA54 AS PT1000	Humidity output 420mA, temperature PT1000
EXT-TN-1072174	LC-FTA54 AS NTC10k	Humidity output 420mA, temperature NTC10k
EXT-TN-1072181	LC-FTA54 AS NTC10kPRE	Humidity output 420mA, temperature NTC10k Precon
EXT-TN-1072228	LC-FTA54 VS PT1000	Humidity output 010V, temperature PT1000
EXT-TN-1072204	LC-FTA54 VS NTC10k	Humidity output 010V, temperature NTC10k
EXT-TN-1072211	LC-FTA54 VS NTC10kPRE	Humidity output 010V, temperature NTC10k Precon

# **Technical Data**

Standards	CE conformity	- 2004/108/EG Electromagnetic compatibility
		- 2001/95/EG Product safety
	EN conformity	- EN60730-1:2002 EMC
		- EN60730-1:2002 Product safety
General data	Measuring element	Relative humidity : capacitive
	Measuring range	Relative humidity: 595%
		(working range 0100%)
	Accuracy@21°C	Relative humidity: typical ±3% in the range
		35%75% RH
	Sensor bushing	PVC, colour pure white
	Filter element	PVDF, permeability 30%
	Clamps	Multi conductor connection, terminal screw
		max 1,5mm²
	Connection head	Polyamide, colour white
	Protection	-20+60°C
		IP65 according to EN60529
	Cable entry	Single entry, M16 for wire conductor with
		max. D=8mm
	Weight	90g
Type V	Power supply	DC 15-24V(±10%) or AC 24V(±10%)
• •	Power consumption	Typical 0.15W / 0.5 VA
	Output	Relative humidity 010V, min. load 5kΩ
Type AS	Power supply	DC 15-24V(±10%)
	Power consumption	Max. 20mA / DC 24V
	Measuring current	Temperature, typical <1mA
	Measuring element	Depending on sensor used
	Measuring range	Depending on sensor used
	Output	- Relative humidity : 420mA
		max. load 800Ω / AC 24V
		- Temperature : passive
	Accuracy@21°C	Depending on sensor used
Type VS	Power supply	DC 15-24V(±10%) or AC 24V(±10%)
••	Power consumption	Typical 0.15W / 0.5VA
	Measuring current	Temperature, typical <1mA
	Measuring element	Depending on sensor used
	Measuring range	Depending on sensor used
	Output	- Relative humidity : 010V, min. load 5kΩ
	·	- Temperature : Passive
	Accuracy@21°C	Depending on sensor used



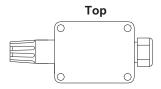
# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

# **Mounting advice**

In case of outdoor installation avoid direct rain and sun contact.



#### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics. Due to the self heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage (±0.2V). When switching the supply voltage on/off, power surges must be avoided on site.

### **Appplication notice**

Due to air circulation dirt and dust particles can be piled up in the course of time on the sintered filter which is protecting the sensor. Thus, the function of the sensor can be affected. After having dismantled the filter, this can be cleaned by blowing it out with oil-free and filtered compressed air, super-clean air or nitrogen or by washing it out with distilled water. If the filter is too dirty, the same should be replaced. Refrain from touching the sensitive humidity sensor. Any tampering will result in an expiration of the warranty.

With normal environmental conditions we recommend a recalibration interval of around 1 year to maintain the indicated accuracy.

At high ambient temperatures and high humidity, or when using the sensor in aggressive gases, an early recalibration or a change of the humidity sensor can become necessary. Such a recalibration or a probable sensor change do not come under the general warranty.

### Terminal connection plan

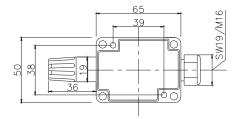
1	2	3	4	5
		GND	Out RH 010V	Uv DC 15-24V AC 24V

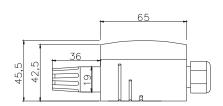
1	2	3	4	5
Sensor	Sensor	RH+	RH-	
A-	B+	Uv DC 15-24V	420mA	

1	2	3	4	5
Sensor A-	Sensor B+	GND	Out RH 010V	Uv DC 15-24V AC 24V

LC-FA54 V LC-FTA54 AS

LC-FTA54 VS





LC-FA54, LC-FTA54



For measuring temperature in outdoor areas, in cold stores and green houses, production plants and warehouses.

Designed for locking on to control and display systems. For type AGS54ext the sensor is sealed in an external pocket.





Types available

Type code	Туре	Description
EXT-TN-1069280	AGS54 Ni1000	Ni1000
EXT-TN-1066555	AGS54 PT1000	PT1000
EXT-TN-1069297	AGS54 NTC10k	NTC10k
EXT-TN-1072075	AGS54 NTC10kPRE	NTC10k Precon
EXT-TN-1069303	AGS54 NTC20k	NTC20k
EXT-TN-1069358	AGS54ext Ni1000	Ni1000
EXT-TN-1069402	AGS54ext PT1000	PT1000
EXT-TN-1069372	AGS54ext NTC20k	NTC20k
EXT-TN-1069426	AGS54ext TRA MultiRange	420mA
EXT-TN-1066562	AGS54ext TRA1	420mA
EXT-TN-1069464	AGS54ext TRV MultiRange	010V

# **Technical data**

Standards	CE conformity	89/336/EWG Electromagnetic compatibility
	EN conformity	- EN60730-1 ( 2000) Interference resistance
		- EN60730-1 (2000) Emitted interference
General data	Sensor bushing	Stainless steel, material 1.4571, Ø=6x25mm
		(AGS54ext only)
	Enclosure	Polyamide, colour white
	Protection	IP65 according to EN60529
Type sensor	Measuring element	Sensor according to customer's request
	Measuring range	Depending on sensor used
	Accuracy	Depending on sensor used
	Measuring current	<1mA
	Clamps	- 2 pole (two wire)
		- 3 pole (three wire)
		- 4 pole (four wire)
		Terminal screw max. 1.5mm <sup>2</sup>
	Cable entry	Single entry, M16 for cable max. D=8mm
	Ambient temperature	Enclosure
		-3590°C
	Weight	- AGS54 : 75g
		- AGS54ext: 85g



# Technical data (cont.)

Type	TRA	(AGS54ext o	nlv)
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,

Type TRV (AGS54ext only)

Power supply	DC 15-24V(±10%)
Power consumption	Max. 20mA / DC 24V
Measuring range	Adjustable at the transducer
	TRA1: -50°C+50°C
	TRA2: -10°C+120°C
	TRA3: 0°C+50°C
	TRA4: 0°C+160°C
	TRA5: 0°C+250°C
	TRA8: -15°C+35°C
Output	420mA, max. load 500Ω / DC 24V
Accuracy@21°C	Typical 1% of measuring range
Clamps	2 pole (two wire)
	Terminal screw max. 1.5mm <sup>2</sup>
Cable entry	Single entry, M20 for cable max. D=8mm
Ambient temperature	Enclosure
	-3570°C
Transport	-3570°C / max 85% RH, non-condensing
Weight	110g
Power supply	DC 15-24V(±10%) or AC 24V(±10%)
Power consumption	Typical 0.42W / 0.84VA
Measuring range	Adjustable at the transducer
	TRV1: -50°C+50°C
	TRV2: -10°C+120°C
	TRV3: 0°C+50°C
	TRV4: 0°C+160°C
	TRV5: 0°C+250°C
	TRV8: -15°C+35°C
Output	010V, min. load 5kΩ
Accuracy@21°C	Typical 1% of measuring range
Clamps	3 pole (three wire)
	Terminal screw max. 1.5mm <sup>2</sup>
Cable entry	Single entry, M20 for cable max. D=8mm
Ambient temperature	Enclosure
	-3570°C
Transport	-3570°C / max 85% RH, non-condensing
Weight	110g
	·

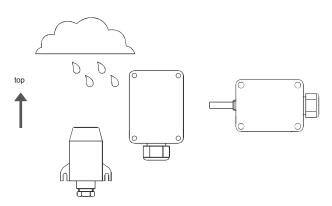
# Security advice /



The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

# Mounting advice

For outdoor installation avoid direct rain and sun contact.





### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

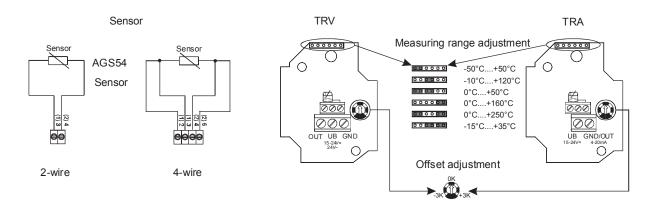
With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that same has to be compensated by the following electronics.

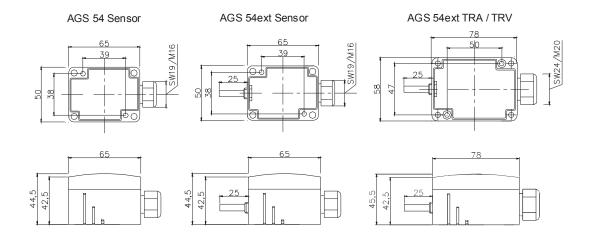
Due to the self heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage.

The adjustment of the measuring ranges is made by changing the bonding jumpers (see terminal connection diagram). The output value in the new measuring range is available after approximately 2 seconds.

### Terminal connection plan







Duct/Immersion temperature sensor for measuring temperature in gaseous media of heating, cooling and air-conditioning systems (e.g. fresh air / exhaust air ducts).

Designed for locking on to control and display systems.

In conjunction with an immersion pocket also suitable for temperature measurment in liquid fluids (e.g. pipeline systems).



# Types available

Type code	Туре	Description
EXT-TN-1069747	AKF10.062.07 TRA MultiRange	420mA, Pocket L 62mm, Ф7
EXT-TN-1069815	AKF10.062.07 TRV MultiRange	010V, Pocket L 62mm, Ф7
EXT-TN-1069525	AKF10.135.07 Ni1000	Ni1000, Pocket L 135mm, Φ7
EXT-TN-1066623	AKF10.135.07 PT1000	PT1000, Pocket L 135mm, Φ7
EXT-TN-1069532	AKF10.135.07 NTC10k	NTC10k, Pocket L 135mm, Φ7
EXT-TN-1069549	AKF10.135.07 NTC20k	NTC20k, Pocket L 135mm, Φ7
EXT-TN-1069884	AKF10.135.07 TRA MultiRange	420mA, Pocket L 135mm, Ф7
EXT-TN-1069952	AKF10.135.07 TRV MultiRange	010V, Pocket L 135mm, Ф7
EXT-TN-1069600	AKF10.192.07 Ni1000	Ni1000, Pocket L 192mm, Φ7
EXT-TN-1066616	AKF10.192.07 PT1000	PT1000, Pocket L 192mm, Φ7
EXT-TN-1069617	AKF10.192.07 NTC10k	NTC10k, Pocket L 192mm, Φ7
EXT-TN-1072099	AKF10.192.07 NTC10kPRE	NTC10k Precon, Pocket L 192mm, Φ7
EXT-TN-1072082	AKF10.192.07 NTC10kPRE11k	NTC10k Precon 11k, Pocket L 192mm, Φ7
EXT-TN-1069624	AKF10.192.07 NTC20k	NTC20k, Pocket L 192mm, Φ7
EXT-TN-1070040	AKF10.192.07 TRA2	420mA, Pocket L 192mm, Ф7
EXT-TN-1070026	AKF10.192.07 TRA MultiRange	420mA, Pocket L 192mm, Ф7
EXT-TN-1070118	AKF10.192.07 TRV2	010V, Pocket L 192mm, Ф7
EXT-TN-1070095	AKF10.192.07 TRV MultiRange	010V, Pocket L 192mm, Ф7
EXT-TN-1069716	AKF10.320.07 PT100	PT100, Pocket L 320mm, Φ7
EXT-TN-1069679	AKF10.320.07 Ni1000	Ni1000, Pocket L 320mm, Φ7
EXT-TN-1069723	AKF10.320.07 PT1000	PT1000, Pocket L 320mm, Φ7
EXT-TN-1069709	AKF10.320.07 NTC1.8k	NTC1.8k, Pocket L 320mm, Ф7
EXT-TN-1069686	AKF10.320.07 NTC10k	NTC10k, Pocket L 320mm, Φ7
EXT-TN-1069693	AKF10.320.07 NTC20k	NTC20k, Pocket L 320mm, Φ7
EXT-TN-1070163	AKF10.320.07 TRA MultiRange	420mA, Pocket L 320mm, Ф7
EXT-TN-1070231	AKF10.320.07 TRV MultiRange	010V, Pocket L 320mm, Ф7

### **Technical data**

Standards	CE conformity	<ul> <li>- 2004/108/EG Electromagnetic compatibility</li> <li>- 2001/95/EG Product safety</li> </ul>
	EN conformity	- EN607301:2002 EMC
		- EN607301:2002 Product safety
General data	Mounting lengths L	62mm/135mm/192mm/320mm
	Operating temperature	-50160°C
	Sensor bushing	Stainless steel, material 1.4571
	Connection head	Polyamide, colour white
	Protection	IP65 according to EN60529
	Protection	IP65 according to EN60529



# Technical data (Cont.)

Type sensor	Measuring element	Sensor according to customer's request
	Measuring range	Depending on sensor used
	Accuracy	Depending on sensor used
	Measuring current	Typical <1mA
	Clamps	- 2 pole (two wire)
		- 3 pole (three wire)
		- 4 pole (four wire)
		Terminal screw max 1.5mm²
	Cable entry	Single entry, M16 for cable max. D=8mm
	Ambient temperature	Connection head
	\\\/ a \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-3590°C
Turne TDA	Weight Power supply	100g DC 15-24V(±10%)
Type TRA	Power supply Power consumption	Max. 20mA / DC 24V
	Measuring range	Adjustable at the transducer
	weasumg range	- TRA1: -50°C+50°C
		- TRA2: -10°C+120°C
		- TRA3: 0°C+50°C
		- TRA4: 0°C+160°C
		- TRA5: 0°C+250°C
		- TRA8: -15°C+35°C
	Output	420mA, max. load 500Ω / DC 24V
	Accuracy@21°C	Typical 1% of measuring range
	Clamps	2 pole (two wire)
		Terminal screw max. 1.5mm²
	Cable entry	Single entry, M20 for cable max. D=8mm
	Ambient temperature	Connection head
		-3570°C
	Transport	-3570°C / max 85% RH, non-condensing
	Weight	115g
Type TRV	Power supply	DC 15-24V(±10%) or AC 24V(±10%)
	Power consumption	Typical 0.35W / 0.82VA
	Measuring range	Adjustable at the transducer
		- TRV1: -50°C+50°C
		- TRV2: -10°C+120°C
		- TRV3: 0°C+50°C
		- TRV4: 0°C+160°C
		- TRV5: 0°C+250°C
		- TRV8: -15°C+35°C 010V. min. load 5kΩ
	Output	,
	Accuracy@21°C	Typical 1% of measuring range 3 pole (three wire)
	Clamps	Terminal screw max. 1.5mm <sup>2</sup>
	Cable ontry	Single entry, M20 for cable max. D=8mm
	Cable entry Ambient temperature	Connection head
	Ambient temperature	-3570°C
	Transport	-3570°C / max 85% RH, non-condensing
	Weight	115q
	***Oignt	··-g

# Security advice /

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.

# Mounting advice

The model AKF10 can be mounted on the ventilation duct either by means of a mounting flange or by screws.

For risk of condensate permeation in the sensor tube respectively in the immersion pocket, the bushing must be installed so that occurred condensate can run off.



#### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

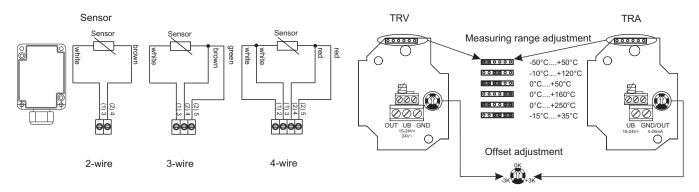
With regard to passive sensors (e.g. PT100 etc.) in 2 wire conductor versions, the wire resistance of the supply wire has to be considered. It is likely that the same has to be compensated by the following electronics.

Due to the self heating, the wire current affects the accuracy of the measurement. Therefore it should not exceed 1mA.

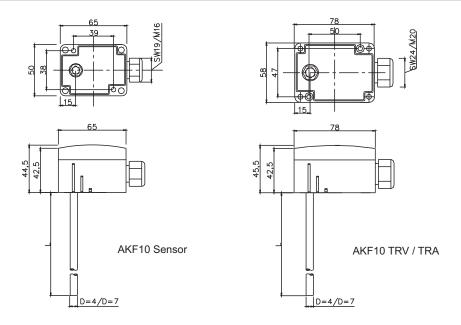
Sensing devices with transducers should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage.

The adjustment of the measuring ranges is made by changing the bonding jumpers (see terminal connection diagram). The output value in the new measuring range is available after approximately 2 seconds.

### Terminal connection plan



With electronic sensors such as AD592, SMT160, LM235, DS1820 the following applies: brown = plus (+), white = minus (-), green = out





Duct/Immersion sensor for measuring air velocity and temperature in gaseous media of heating, cooling and air-conditioning systems (e.g. fresh air / exhaust air ducts).

Designed for locking on to control and display systems.



# Types available

Type code Type Description

EXT-TN-1071672 AVT Air velocity transmitter

# **Technical data**

Standards	CE conformity	2004/108/EC EMC
o tarradi do	,	2002/95/EC RoHS
		2006/95/EC LVD
		2002/96/EC WEEE
General data	Power supply	DC 24V / AC 24V(±10%)
	Power consumption	35mA (50mA with relay) + 40mA with mA output
	Measuring range	- Air velocity
		02m/s, 010m/s oder 020m/s, selectable
		on the device
		- Temperature
		050°C
	Output	- Air velocity
		$010V$ (linear to m/s), load min. $1k\Omega$ or
		420mA (linear to m/s), load max. $400\Omega$
		- Temperature
		$010V$ (linear to °C), load min. $1k\Omega$ or
		420mA (linear to °C), load max. 400Ω
	Material	- Housing : ABS
		- Cover : PC
		- Probe pipe : stainless steel
	Electrical connection	<ul> <li>Screwing terminals, max. 1.5mm²</li> </ul>
		- Cable entry M16
	Dimensions	- Housing LxWxH : 90 x 71.5 x 36 mm
		- Probe DxL : 10 x 210 mm
		Adjustable immersion length 50190mm, with
	<del> </del>	mounting flange
	Measuring element	PT1000 and NTC10k
	Accuracy	- Air velocity
		Range 0 2m/s : <0.1m/s + 5% from reading
		Range 010m/s : <0.5m/s + 5% from reading
		Range 020m/s : <1.0m/s + 5% from reading
		- Temperature:
	Madia	<0.5°C (velocity > 0.5m/s)
	Media	Air and non-combustible gasses
	Ambient temperature	0+50°C / max. 85% RH, non-condensing
	Storage temperature	-2070°C
	Protection	IP54 according to EN 60529

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# Security advice <u>M</u>

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

Weight

The modules must not be used with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people or animals.



#### **Electrical connection**

The devices are constructed for the operation of protective low voltage (SELV). For the electrical connection, the technical data of the corresponding device is valid.

Sensing devices with transducer should in principle be operated in the middle of the measuring range to avoid deviations at the measuring end points. The ambient temperature of the transducer electronics should be kept constant. The transducers must be operated at a constant supply voltage (±0,2V).

When switching the supply voltage on/off, power surges must be avoided on site.

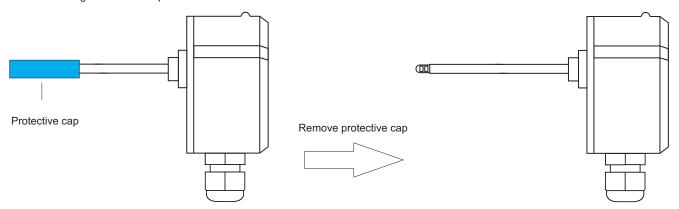
#### Installation

A prerequisite for the operation is a proper installation of all electrical supply, control and sensing leads as well as the pressurised connection line

Before installing the device, the leak tightness of the pressurised connection lines must be inspected.

The air velocity transmitter AVT is supplied with a special protective cap protecting the sensitive sensor element against damage during transport.

Before installing the AVT the cap must be removed.

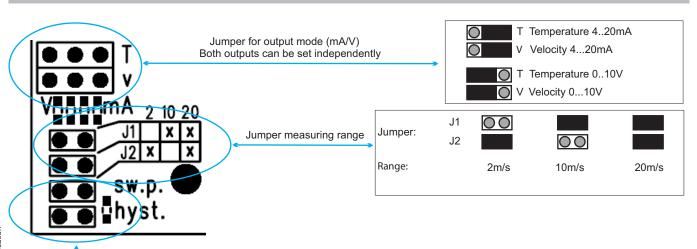


# **Mounting advice**

The supply cable and control cable for relay should be separated, if high voltage (no safety extra-low voltage) is used as relay contact. Both of the cable has its own cable entry.

The relay settings need to be done before high voltage (no safety extra-low voltage) is connected to the device. This ensures human safety against electrical shock. The device is equipped with a lid fixing crew. The screw needs to be used when high voltage (no safety extra-low voltage) is connected to the device.

### Terminal connection plan



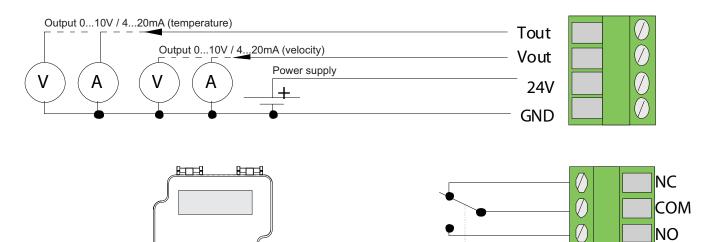
# Jumper and Push button for setting the relay parameters

Set the jumper "switching point" (sw.p) and push the button to adjust the switching point of the relay. The value chosen (m/s) is shown on the display.

Set the jumper "hysteresis" (hyst.) and push the button to adjust the hysteresis of the relay switching point. The value chosen (m/s) is shown in the display.

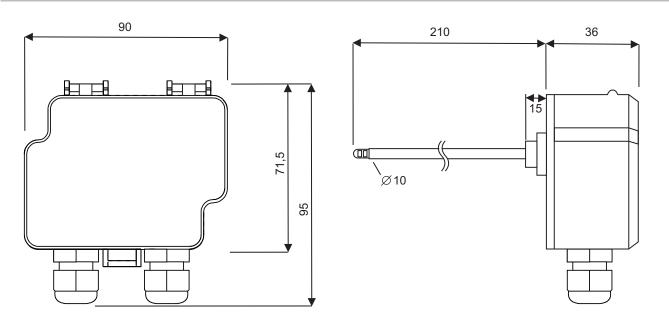


# Terminal connection plan (cont.)





Air flow direction





Miscellaneous accessories for sensors

- Mounting flange
- Tightening strap with contact fluid
- Immersion pockets, nickel-plated brass, for sensors Immersion pockets, stainless steel, for sensors



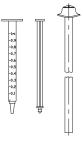
# Types available

Type code	Туре	Description
EXT-TN-1072525	SPB900	Tightening strap with contact fluid
EXT-TN-1072402	MF6	Mounting flange
EXT-TN-1072419	MF7	Mounting flange
EXT-TN-1070309	MF7 flex	Mounting flange
EXT-TN-1071313	MF19	Mounting flange
EXT-TN-1070316	THMS50	Immersion pocket, nickel-plated brass, length 50mm
EXT-TN-1066890	THMS120	Immersion pocket, nickel-plated brass, length 120mm
EXT-TN-1066883	THMS185	Immersion pocket, nickel-plated brass, length 185mm
EXT-TN-1070347	THMS300	Immersion pocket, nickel-plated brass, length 300mm
EXT-TN-1070354	THVA50	Immersion pocket, stainless steel, length 50mm
EXT-TN-1070361	THVA120	Immersion pocket, stainless steel, length 120mm
EXT-TN-1070378	THVA185	Immersion pocket, stainless steel, length 185mm
EXT-TN-1070385	THVA300	Immersion pocket, stainless steel, length 300mm

# Tightening strap and contact fluid

**Tightening strap and** contact fluid (SB900)

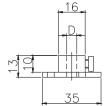
- Accessory for contact sensors
- Syringe contact fluid 0.5mm<sup>3</sup>
- Tightening strap L=900mm

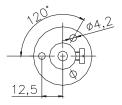


# **Mounting flange**

Mounting flange D=6 / 7mm (MF6 / MF7)

- Suitable for mounting temperature sensors on air ducts
- Material brass, blue zincked
- Max. temperature 130°C
- Available for sensor bushings with a pipe diameter of 6mm and 7mm



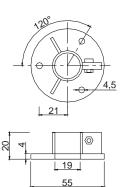




# Mounting flange (cont.)

### Mounting flange D=19mm (MF19)

- Suitable for mounting duct humidity and duct air quality sensor on air ducts
- Material PA6.6, color black



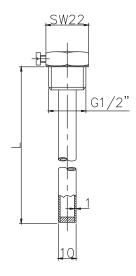
# **Immersion pocket**

### Immersion pocket nickel-plated brass (THMS)

- For immersion temperature sensors AKF10 with D=7mm
- Hard soldered
- Pressure-proved up to 16bar Thread G1/2" DIN 2999 Across flats SW22

- Max. temperature 130°C
- Mounting length

50 120 185 300 Sensor 62 135 192 320



# Immersion pocket stainless steel (THVA)

- For immersion temperature sensors AKF10 with D=7mm
- Welded
- Pressure-proved up to 40bar
- Material 1.4571
- Thread G1/2" DIN ISO 228T1; undercut B; flat sealing
- Across flats SW24
- Max. temperature 260°C
- Mounting length

50 120 185 300 Sensor 62 135 192

