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Product info sheet no. C 4.8
Humidity/-temperature sensors

With „Ex“ licence for locations with explosive gas atmosphere and for locations with inflammable dust for application under atmospheric conditions

Description

MELA-Humidity/-temperature sensors in these series are used to measure relative humidity or relative humidity and temperature in air and other non-aggressive gases in rooms where there is a risk of explosion and in locations with inflammable dust.
Note: The selection of electrical equipment in locations with inflammable dust must be made by the operator in accordance with **DIN EN 50281-1-2** „Selection, installation and maintenance“!
The sensors comprise a robust sensor part in a high-grade steel housing with a sintered protective basket mounted on an aluminium die-casting housing.
The connection to a non-intrinsically safe electrical power circuit is achieved over one, and for the combined humidity and temperature sensors over two transmitter power supply units with galvanically separated power input points.

Use of ***MELA-humidity sensor elements*** is a guarantee of:

- high long-term stability
- almost linear characteristic curve
- good dynamic performance
- resistance to dew formation
- small hysteresis.

Type variants - order designation

Measuring unit	GC series	KC series
F (relative humidity)	FGC3.Ex/5	FKC3.Ex/5
K (rel. humidity / temp.)	KGC3.Ex/5	KKC3.Ex/5
T (temperature)	TGC3.Ex/5	TKC3.Ex/5
weight	ca. 380 g	ca. 470 g

Ex **II 1/2 G EEx ia IIC T4**

Ex **II 2D T95°C IP65**

Approved for use in areas where there is danger of an explosion:
EC Design Test Certificate:
IBExU 00 ATEX 1019

Technical data

Humidity

Measuring range ..... 0…100%rh
Accuracy (MR 5…95%rh at 10...40°C) ..... ±2%rh
at < 10°C ..... 0.1%/K additional
Set up time (T 90 at 1 m/s) ..... < 2 minutes
Output ..... 4...20 mA

Temperature

Measuring element (DIN IEC751) ..... Pt100 class B
Measuring range .... - 20…80°C (with special models also 0...50°C or 0...100 °C. Observe admissible application temperature!)
Accuracy ..... ± 0.3 K
at <10°C, >40°C ..... ±0,007K/K additional
Output ..... 4...20 mA

Others

Storage temperature ..... - 20…80°C
Approved operating temperature range ..... - 20…80°C
Maximum surface temperature of housing ..... 95°C
Sensor operating voltage ... 12..20 V DC (intrinsically safe)
Maximum input voltage U_i ..... 20V DC
Maximum input amperage I_i ..... 93 mA
Maximum input power P_i ..... 660 mW
Maximum inner capacity C_i ..... 141 nF
Maximum inner inductivity L_i ..... < 0.01 µH

Protection level ..... IP 65
electrical equipment in instrument group II with protection from housing

Housing material
Sensor part ..... stainless steel
Converter part ..... alu-diecast
Cable screwing M16 x 1,5
clamping range ..... 3...7 mm
initial torque
(for recommended cable type) 4,0Nm

Cable between Sensor and transmitter power supply unit
Recommended type ..... NF14 (Metrofunk)
Maximum power transmission length ..... 100 m
Maximum cable capacity ..... 20 nF
Ends of the power line ..... Wire cases with plastic collars
Electro-magnetic compatibility
Interference transmission level ..... EN 55011 Kl.B
Immunity to interference ..... EN 50082-2

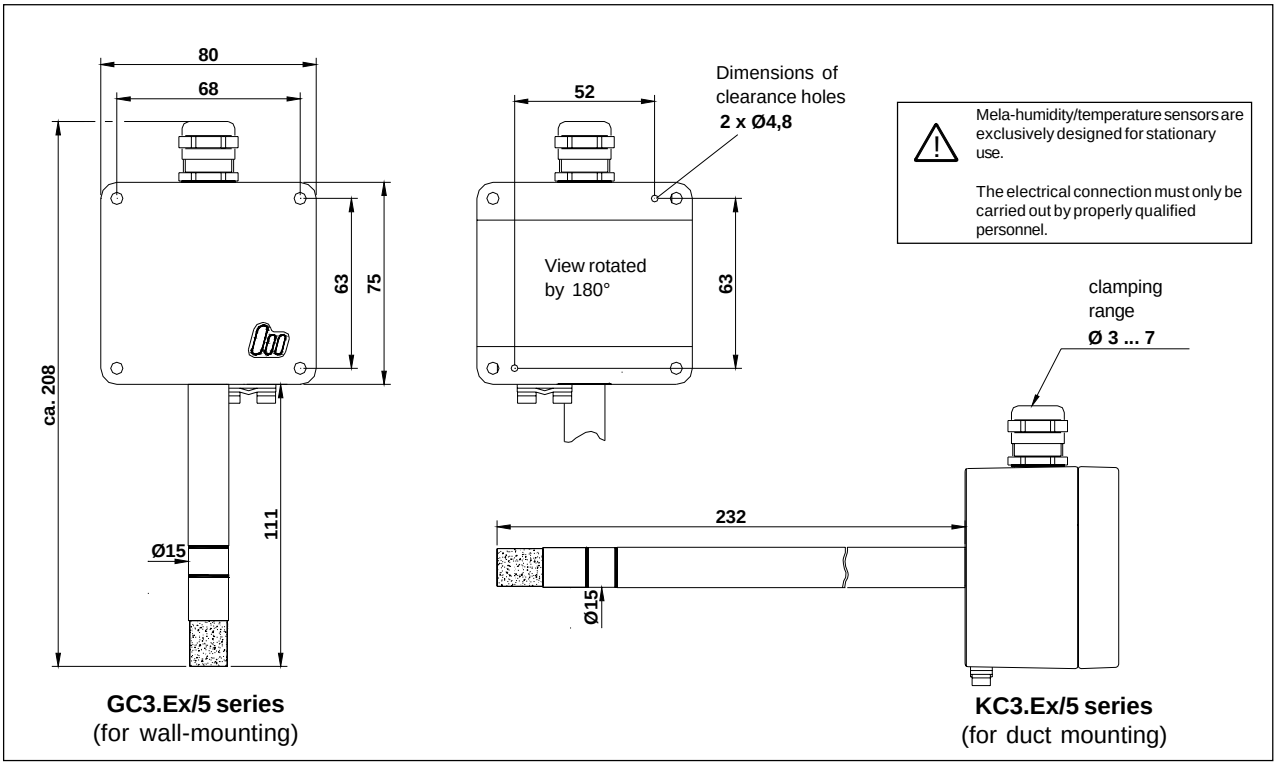
Transmitter power supply unit

Mains voltage ..... 20...35 V DC
Voltage U_0 ..... ≤ 20 V DC
Amperage I_0 ..... ≤ 93 mA
Output P_0 ..... ≤ 660 mW
Galvanic separation
Input Output ..... according EN 50 020
Input network ..... according EN 50 020
Order designation **KFD2-CR-EX1.20 200**
„reserve of technical modifications“

Assembly instructions

MELA-humidity/temperature sensors should be installed in a location which is representative for measuring the environmental conditions.
The connection to a non-intrinsically safe power circuit should be arranged over one or two transmitter power supply units matching the required specification (U_0, I_0, P_0) according to the connection diagram. Regulations according to EN 60 079 – 14 must be observed during the installation.
Only fixed cables and electric lines may be introduced onto the cable joint. The maximum cable length and the maximum approved cable capacity must also be observed. As a general rule, a maximum cable length of 100 m should be adhered to.
Taking the installation notes on page 3 of this data sheet into consideration, in exceptional cases, cable lengths of up to 200 m are also permissible. The maximum approved cable capacity must be observed. After connecting it up, replace the housing and seal tightly.
The inherently safe humidity and temperature sensors (Type of protection „ia“) can also be used as class 1 equipment. When doing so, make sure that when attaching the sensor to a partition barrier, you only use assembly kit ZA40.
Please order assembly kit ZA40 separately!
Please refer to pages 3 and 4 for further safety advice and dimension diagrams for connecting to zone 0.
The installation orientation of the sensor is not important. It should, however, be installed in such a way that one avoids the entry of water.
Dew and water spray do not damage the sensor in any way but before the full drying out process on the sensor element and in its immediate environment is obtained, it leads to measurement errors.
A screened cable is used to connect the cable whole in operation in order to maintain the immunity to interference according to **EN 50082-2** which should be properly installed in the EMV-Pg of the sensor.In order to arrange a simple test of the functionality of the sensor on the site, we recommend the ***MELA-humidity standard type ZE 31/1*** with the ***additional adapter type ZE 33*** (product information no. F 5.2).
Dust does not damage the sensor but it negatively affects its dynamic behaviour.
The sintered protective cage can be carefully unscrewed and washed out if too much dust accumulates.
Caution! Do not open in location with explosive dust atmosphere!
Loose dirt can also be removed from the measuring element by blowing or carefully flushing with distilled water.
The sintered protective cage should be in an absolutely dry condition when it is screwed on again in order to avoid measurement errors. It is important not to touch the highly sensitive sensor element in the process. The screwing at the sintered protective cage has to be pulled up tightly.
Further guidelines which you should observe when using humidity sensors with capacitive sensory elements can be obtained from ***Application guidelines for the use of sensor elements*** (product information no. A 1) or you can ask the manufacturer.

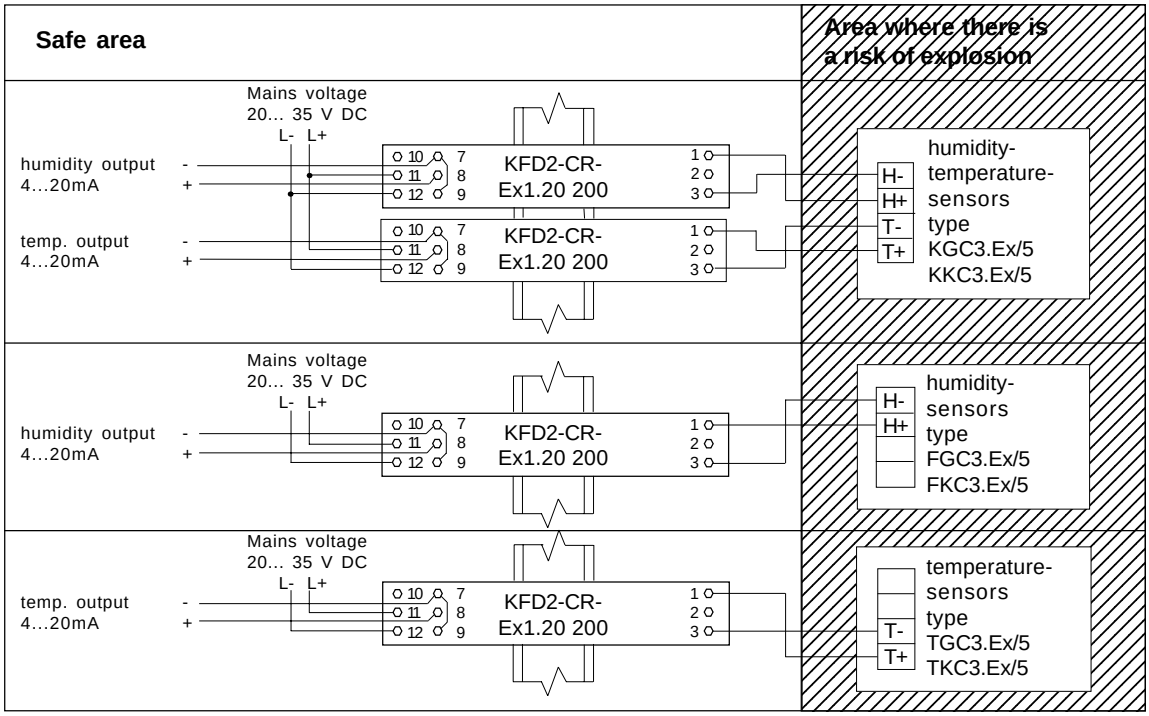
Dimensions



GC3.Ex/5 series
(for wall-mounting)

KC3.Ex/5 series
(for duct mounting)

Connection diagrams

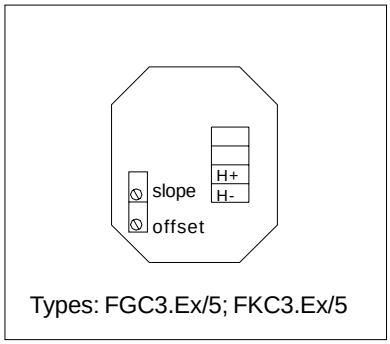


Safety Information

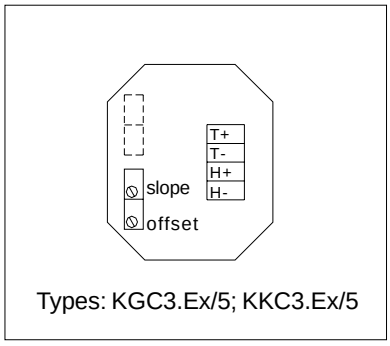
The sensor may only be opened and operated while open when it is not in the potentially explosive atmosphere. After calibration, replace housing and seal tightly.

Calibration Information:

Potentiometer Configuration



Types: FGC3.Ex/5; FKC3.Ex/5



Types: KGC3.Ex/5; KKC3.Ex/5

Installation notes on using cable lengths up to 200 m

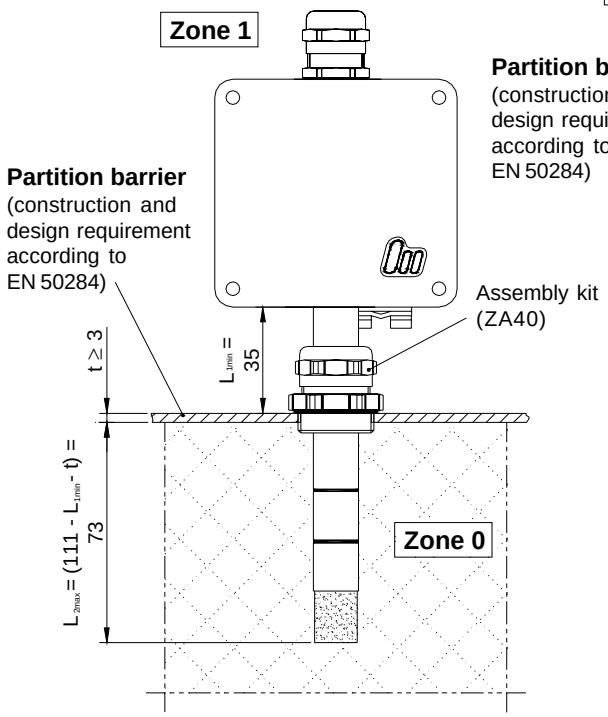
The internal capacity given on the label (Ci = 141 nF) applies for a maximum cable length of 100 m of the recommended type of cable between the sensor and the transmitter power supply unit.

When using a longer cable, an additional capacity of 20 nF/100 m + 10% tolerance must be taken into consideration.
The power supply values (U_0 , I_0, P_0) as well as the permissible capacity as defined in accordance with DIN EN 50 020 of 220 nF may not be exceeded.
During installation the additional requirements for the type of protection „i“ - intrinsic safety according to DIN EN 60 079 - 14, section 12 must be adhered to.

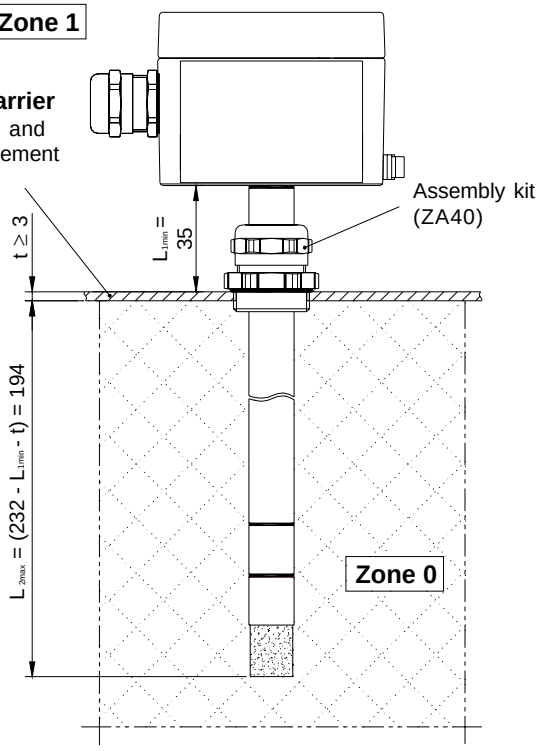
Installing a humidity and temperature sensor with connection to zone 0

The humidity and temperature sensor is to be installed by using the assembly kit ZA 40, according to the **dimension diagram on page 4,** in the wall of the hazardous area with class 1 requirements.
This partition barrier must be made of corrosion-resistant material compatible with the application, must be homogenous and have a wall thickness of at least 3 mm, and must have a screw of M25x1,5.
Otherwise additional protection measures are necessary in accordance with EN 50284.
When the sensor is removed there is a danger of releasing potentially explosive atmosphere and the occurrence of flames from the outside. For this reason the opening must be closed again immediately. Only attach the humidity and temperature sensors using the increased safety-type cable gland provided in the assembly kit **ZA 40**.
Please order assembly kit **ZA 40** separately.
The screw connections are to be tightened using a tool with a tightening torque of 10 Nm.
The threaded joints are to be tightened hard using a tool and you must not be able to undo them by hand.
When removing the sensor, the increased safety-type cable gland stays in the partition barrier. The opening is closed again by simply replacing the normal seal insert with the increased safety-type filler seal insert from the assembly kit **ZA-40**.

Dimension diagrams for connection to zone 0

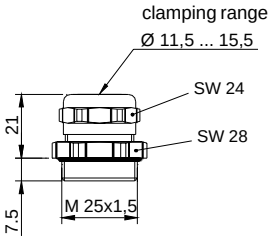


GC/5-Ex series
(for wall-mounting)

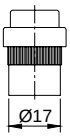


KC/5-Ex series
(for duct mounting)

Assembly kit
ZA 40
for connection to zone 0
(please order separately)



"Increased safety"-type cable gland
for mounting sensor in partition barrier



"Increased safety"-type filler seal insert
to close the opening in the partition barrier after removing the sensor

The electrical connection must only be carried out by properly qualified personnel.

Attention must be paid to construction and design requirement according to EN 50284 and also to installation advice.

When the sensor is removed there is a danger of releasing potentially explosive atmosphere and the occurrence of flames from the outside.