**Product info sheet no. C 4.7**

**Humidity-/temperature sensors**

For industrial applications up to 200°C, up to 25 bar

**Description**

MELA®-humidity-/temperature sensors in this series are supplied with a robust aluminium die cast housing with an inox or aluminium sensor part to measure relative humidity or relative humidity and temperature in air and other non-aggressive gases for a working temperature range of up to 200°C. The pressure-proof executions "D" and "HD" can be used at pressures up to 25 bar, at temperatures up to 125°C or up to 160°C. These sensors are ideally suited for industrial applications, e.g. in drying processes.

The advantages of the series .../9 are its improved dynamics, in particular at low air speeds and its increased service life, even under more challenging operating conditions (pollutant impact or permanent humidity > 95 %rh).

When air speeds are extremely high combined with a high number of particles, using the series .../9 is not recommended.

**Technical data**

**Humidity**

- measuring range: 0...100%rh
- accuracy: (10...40°C; 5...95%rh) ±2.0%rh
- influence of temperature <10°C, >40°C: <0.1%K

**Temperature**

- measuring element (ref. DIN EN 60751): Pt100 class B
- measuring range:
  - transmitter part: series GC: -20...+80°C
  - sensor part: series ZC, ZC.D, KC, .../D, ZC.D: -25...+125°C
  - series ZC, KC, ZC.D: -40...+125°C
  - series ZC.H: -40...+160°C
- influence of temperature <10°C, >40°C: ±0.007 K/K

**Other data**

- ambient temperature
  - transmitter part: 2-wire...12...30V DC
  - voltage output: 3/4-wire...24V±10% AC or 15...30 V DC
  - degree of protection
  - transmitter part: IP 65
  - sensor head: IP 65
  - sensor head (GC): IP 30
- housing material
  - sensor part (except series GC): inox
  - sensor part series GC: aluminium
- material
  - pressure-proof executions: D, HD
  - temperature range of up to 200°C

**Pressure**

- operating voltage: 0...10 V DC ± 50Ω
- load resistance (voltage output): ≥10kΩ
- power consumption (voltage output): ≤5mA
- self-heating coefficient Pt100: 0.02 A

**Directive about electromagnetic compatibility**

- 2004/108/EG
- DIN EN 61326-1: issue 10/06
- DIN EN 61326-2-3: issue 05/07

**Special versions available on request**

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**Type Versions**

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Analogue output</th>
<th>GC series</th>
<th>KC series</th>
<th>ZC series</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>0...20 mA</td>
<td>FGC 4x</td>
<td>FKC 4x</td>
<td>FZC 4x</td>
</tr>
<tr>
<td></td>
<td>4...20 mA</td>
<td>FGC 3x</td>
<td>FKC 3x</td>
<td>FZC 3x</td>
</tr>
<tr>
<td></td>
<td>0...10 V</td>
<td>FGC 2x</td>
<td>FKC 2x</td>
<td>FZC 2x</td>
</tr>
<tr>
<td>C</td>
<td>0...20 mA, Pt100</td>
<td>CGC 4x</td>
<td>CKC 4x</td>
<td>CZC 4x</td>
</tr>
<tr>
<td></td>
<td>4...20 mA</td>
<td>CGC 3x</td>
<td>CKC 3x</td>
<td>CZC 3x</td>
</tr>
<tr>
<td></td>
<td>0...10 V, Pt100</td>
<td>CGC 2x</td>
<td>CKC 2x</td>
<td>CZC 2x</td>
</tr>
<tr>
<td>K</td>
<td>2 x 0...20 mA</td>
<td>KGC 3x</td>
<td>KKC 3x</td>
<td>KZC 3x</td>
</tr>
<tr>
<td></td>
<td>2 x 0...10 V</td>
<td>KGC 2x</td>
<td>KKC 2x</td>
<td>KZC 2x</td>
</tr>
<tr>
<td>T</td>
<td>Pt100</td>
<td>TGC 5/5</td>
<td>TKC 5/5</td>
<td>TZC 5/5</td>
</tr>
<tr>
<td></td>
<td>0...10 V</td>
<td>TGC 3/5</td>
<td>TKC 3/5</td>
<td>TZC 3/5</td>
</tr>
<tr>
<td></td>
<td>0...10 V</td>
<td>TGC 2/5</td>
<td>TKC 2/5</td>
<td>TZC 2/5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Analogue output</th>
<th>ZC.D series</th>
<th>ZC.H series</th>
<th>ZC.HD series</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>0...20 mA</td>
<td>FZC 4.Dx</td>
<td>FZC 4.Hx</td>
<td>FZC 4.HDx</td>
</tr>
<tr>
<td></td>
<td>4...20 mA</td>
<td>FZC 3.Dx</td>
<td>FZC 3.Hx</td>
<td>FZC 3.HDx</td>
</tr>
<tr>
<td></td>
<td>0...10 V</td>
<td>FZC 2.Dx</td>
<td>FZC 2.Hx</td>
<td>FZC 2.HDx</td>
</tr>
<tr>
<td>C</td>
<td>0...20 mA, Pt100</td>
<td>CZC 4.Dx</td>
<td>CZC 4.Hx</td>
<td>CZC 4.HDx</td>
</tr>
<tr>
<td></td>
<td>4...20 mA, Pt100</td>
<td>CZC 3.Dx</td>
<td>CZC 3.Hx</td>
<td>CZC 3.HDx</td>
</tr>
<tr>
<td></td>
<td>0...10 V, Pt100</td>
<td>CZC 2.Dx</td>
<td>CZC 2.Hx</td>
<td>CZC 2.HDx</td>
</tr>
<tr>
<td>K</td>
<td>2 x 0...20 mA</td>
<td>KZC 3.Dx</td>
<td>KZC 3.Hx</td>
<td>KZC 3.HDx</td>
</tr>
<tr>
<td></td>
<td>2 x 0...10 V</td>
<td>KZC 2.Dx</td>
<td>KZC 2.Hx</td>
<td>KZC 2.HDx</td>
</tr>
<tr>
<td>Weight approx.</td>
<td>520 g</td>
<td>520 g</td>
<td>520 g</td>
<td></td>
</tr>
</tbody>
</table>

/\ please select the appropriate filter (refer also to datasheet F5.1)

**series GC:**
- open protective basket ZE16
- integ. element filter made of PTFE and ZE16

**series KC, ZC:**
- sintered inox filter ZE13
- integ. element filter made of PTFE and ZE04

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This information is based on current knowledge and is intended to provide details of our products and their possible applications. It does not, therefore, act as a guarantee of specific properties of the products described or of their suitability for a particular application. It is our experience that the equipment may be used across a broad spectrum of applications under the most varied conditions and loads. We cannot appraise every individual case. Purchasers and/or users are responsible for checking the equipment for suitability for any particular application. Any existing industrial rights of protection must be observed. The perfect quality of our products is guaranteed under our General Conditions of Sale. Issue: June 2012 C47_E. Subject to modifications.
Install the MELA®-humidity/temperature sensors in a place where characteristic climatic conditions can be measured. We recommend to use the MELA®-ZA 24-type mounting plate (product info sheet no. F 5.1) for wall or duct-mounting.  

The specified minimum air speed and - with current output - the load according to the operating voltage (diagram) should be complied with. Deviations may lead to additional measuring faults resulting of the self-heating of the sensor.

The sensor can be installed in any position. However, do not position it in a position where water ingress can occur. Dew formation and splashes do not damage the sensor, although corrupted measurement readings are recorded until all the moisture on and directly around the sensor element has dried up.

In order to maintain interference immunity in accordance with EN 61326-2-3 when it is in use, we recommend to use a screened cable (type recommended: 8x AWG26 C UL order no. 5339) for connecting the sensors, and have this fitted into the sensor’s EMC heavy-gauge conduit thread by a qualified electrician.

In order to check functioning in the place of installation, we recommend that you use the MELA®-ZE31/1-type humidity standard with a ZE 33-type auxiliary adapter (product info sheet no. F 5.2).

Dust does not cause any harm to the humidity sensor, however, it does affect dynamic performance. The protective filter should only be screwed off carefully to check functioning with a humidity standard.

It is important not to touch the highly sensitive sensor element in the process. If necessary, soiled filters can be screwed off and rinsed. When you screw them back on, bear in mind that sensors will not measure accurately again until they are completely dry. Sensors of the series .../9 can be completely and carefully cleaned in distilled water. It is not possible to exchange the PTFE filter on the humidity sensor element. Please consult the application instructions for the sensing elements (product info sheet no. A 1) or check with the manufacturer for further information which you need to bear in mind when using humidity sensors with capacitive sensing elements.

Caution! When you install the pressure-proof sensors (series ZC.D and ZC.HD), do not apply a torque in excess of 25 Nm.

Sensors with voltage output have no galvanic separation between output and operating voltage at the negative pole.

The humidity output and temperature output of sensors with current output are always galvanically separated from each other!

**Working range for humidity and temperature**

<table>
<thead>
<tr>
<th>% rh</th>
<th>-40°C</th>
<th>0°C</th>
<th>40°C</th>
<th>80°C</th>
<th>120°C</th>
<th>160°C</th>
<th>200°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dimensions**

<table>
<thead>
<tr>
<th>Series</th>
<th>ZCx/5 (up to 125°C)</th>
<th>ZCx.D/6 (up to 25 bar)</th>
<th>ZCx.H/6 (up to 200°C)</th>
<th>ZCx.HD/6 (up to 25 bar, up to 160°C)</th>
<th>ZCx.HD/9 (up to 25 bar, up to 160°C)</th>
<th>ZCx.D/9 (same as ZCx/H9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions of clearance holes</td>
<td>2 x Ø4,8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions of clamping range</td>
<td>Ø 3...7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GCx/5</td>
<td>(for wall-mounting, up to 80°C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KCx/5</td>
<td>(for duct mounting, up to 125°C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*) other dimensions available on request
Humidity/- temperature sensor
Output: 2 x 0...10V
(KGC2/x, KKC2/x, KZC2/x, KZC2.D/x, KZC2.HD/x, KZC2.H/x)

Humidity sensor
Output: 0...10V
(FGC2/x, FKC2/x, FZC2/x, FZC2.D/x, FZC2.HD/x, FZC2.H/x)

Humidity/- temperature sensor
Output: 0...10V, Pt100
(CGC2/x, CKC2/x, CZC2/x, CZC2.D/x, CZC2.HD/x, CZC2.H/x)

Humidity/- temperature sensor
Output: 2 x 4...20mA

Humidity sensor
Output: 4...20mA (0...20mA)

Humidity/- temperature sensor
Output: 4...20mA (0...20mA), Pt100

Connection diagram
Humidity/- temperature sensors for industrial applications up to 200°C, up to 25 bar

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

Temperature sensor
Output: 0...10V
(TGC 2/5 , TKC 2/5)

Temperature sensor
Output: Pt100
(TGC 5/5 , TKC 5/5)

Temperature sensor
Output: 4...20mA
(TGC3/5 , TKC3/5)

Humidity/- temperature sensors
for industrial applications up to 200°C, up to 25 bar

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