# Temperature Humidity Sensor

# OMC-406

Contents

## 1. Introduction

The air temperature and hum idity probe OM C-406 provides ac curate and prec ise m easurements of humidity and t emperature. A dvancements i n s ensor and i ntegrated c ircuit t echnology has m ade i t possible to achieve outstanding performance from a hand-hel d probe. Through the use of the probe and by proper application of basic procedures when obtaining humidity measurements the date will be reliable and dependable.

## 1.1 Technical description

The humidity s ensor us ed i n t he OM C-406 i s a s olid s tate dev ice w hich c hanges i ts el ectrical characteristics at extremely small changes in hum idity. T hese c hanges are det ected, l inearized and amplified as an anal og-output by uni que el ectronic c ircuitry s pecifically des igned f or m aximum performance. The temperature sensing system also uses integrated circuit technology in combination with an accurate temperature element (PT-100) to produce high quality data.

### 1.2 Specification Humidity measurement

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| Measuring range . . . . . . . . . . . . . . . . . . . . | 0...100 %RH Linear |
| Accuracy at 22 deg.C . . . . . . . . . . . . . . . . | < ± 2%RH in reference to calibration |
| Precision . . . . . . . . . . . . . . . . . . . . . . . . . | < 1 %RH, long term stable |
| Hysteresis for a 4 hour cycle . . . . . . . . . . | < 1 %RH |
| Time Constant at 25%C . . . . . . . . . . . . . | < 10 sec. |
| Temperature Error . . . . . . . . . . . . . . . . . . | ± 05 %RH/70 deg.C (complete probe) |
| Linear Output . . . . . . . . . . . . . . . . . . . . . | 0...20 mA = 0...100 %RH, max 500 ohm |
| Calibration Points . . . . . . . . . . . . . . . . . . | 35 %, 80 %, 10 %, 0 % RH |

### 1.3 Specification Temperature measurement

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|---|---|
| Sensing element . . . . . . . . . . . . . . . . . . . . | RTD Pt-100 Ohm |
| Measuring Range . . . . . . . . . . . . . . . . . . . | -40...+60 deg. C, linear |
| Accuracy . . . . . . . . . . . . . . . . . . . . . . . . . | <± 0.5 deg.C from - 30 to...150 deg.C |
| Precision . . . . . . . . . . . . . . . . . . . . . . . . . | 01 deg.C, long term stab. |
| Time constant . . . . . . . . . . . . . . . . . . . . . | t 09 air 10 sec. |
| Temperature Error . . . . . . . . . . . . . . . . . . | ±0,35 deg.C / 70 deg.C |
| Linear Output . . . . . . . . . . . . . . . . . . . . . | 4...20 mA = -40...+60 deg.C. max 500 ohm |
| Linear Output . . . . . . . . . . . . . . . . . . . . . | 0...20 mA = -40...+60 deg.C, max 500 ohm |
| Calibration Points . . . . . . . . . . . . . . . . . . | Tmin and Tmax |

### 1.4 General information

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|---|---|
| Power supply . . . . . . . . . . . . . . . . . . . . . | 8..26.5 VDC, 50 mA Max. |
| Operating Temp. electronics . . . . . . . . . . | -40...+60 deg.C |
| Protection of the Sensors . . . . . . . . . . . . | Wire mess Filter |
| Dimensions . . . . . . . . . . . . . . . . . . . . . . . | Length 265 mm, Diameter 25 mm |
| Weight . . . . . . . . . . . . . . . . . . . . . . . . . . | 100 g |
| Calibration devices . . . . . . . . . . . . . . . . . | EM-25 |
| Humidity Standards . . . . . . . . . . . . . . . . . | EA-20, 35, 50, 65, 80, 95 %RH |

Technical modifications reserved.

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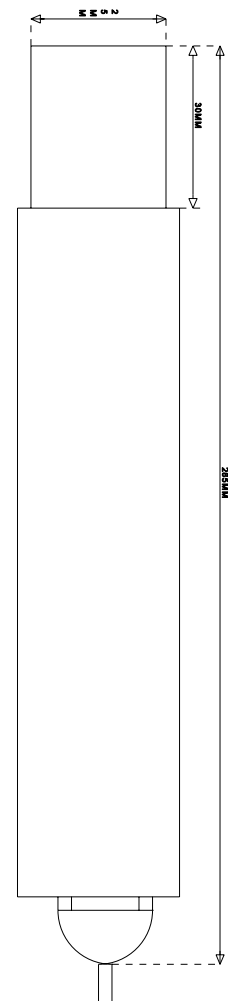
2. Operation


**ATTENTION:** Using a supply voltage other than the specified voltage and/or overloading the outputs may damage the instrument and result in erroneous readings.

Connect the probe with a 4 core cable to the DCU or any other device. The four core cable is used for supply (2 cores) and the signal lines temperature and humidity. System is immediately ready for measurement.


3. Measurement practices

The probes is carefully calibrated before delivery. Therefore is not necessary to check the calibration of new probe's. After switching-on the probe is ready. Accuracy and reliability of measurement depend on how well the sensing elements and the entire assembly are in equilibrium with the surrounding.


**ATTENTION:** Before a correct reading can be done, the probe and the medium to be measured must be at the same temperature and in equilibrium with the humidity. At 50% RH a temperature difference of 1 degree celsius results in an error of +/- 3% RH.

The time required for the sensing to get in equilibrium with the product to be measured can vary from 1 to 30 minutes depending on:


1        difference in humidity and temperature between product and probe at the beginning

2        stability of the parameters during the adaption time

3        the speed at which water vapor can be interchanged between sensing element and the ambient.

For accurate measurements following practices should be followed:


1        Keep the product and the probe in an area where there is no air draughts or heating/air condition cycling.

2        Avoid having the product or probe in sunlight. This produces temperature variation, thereby infecting the humidity measurement.

3        Avoid making any measurements where there are water sprays, steam sprays, dripping water etc.

4        Do not use probes in dusty/dirty environments unless equipped with proper dust filters.

5        Never clean out the dust filter using pressurized air.

6        Never place your hand directly over the sensing element to see response time and then place the probe in the product, expecting quick equilibrium. This practice produces a new condition for the probe and equilibrium can take longer.


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A displayed value above 100% (150% typical) m ay be an i ndication  f or condensation in the sensing element and/or in the assembly. Condensation does not dam age the probe and does  not change the calibration. The probe can be restored by drying in a light airflow like 1m/sec. This drying period of 2-4 hours can be reduced by slightly heating the airflow up to 40 or 50 deg.C.

In presence of pollutants consult OBSERMET.

## 4. Measurement in gases

The probe OMC-406 is designed for measurement in gases. Because the heat transfer between gase s and solids is very slow the probe was designed with very little mass to speed up the time  constant.  The OMC-406 probe can be us ed in still or m oving air. Adaption to the environment is 4 times faster in air with  a  movement of  1 m .sec. as  oppos ed t o a m easurement i n s till ai r. T he s ensor c an operat e satisfactorily in air m ovements up t o 10 m /sec. As m entioned in i tem 6 of  "measurement prac tices", never place your hand over the sensor. The sensors are fast responding units and the best manner to observe response is by placement into the product.

## 5. Calibration

The OMC-406 probe is carefully calibrated prior to shipment. We recommend to recalibrate once a year.

Please contact  our lab whenever recalibration is required.
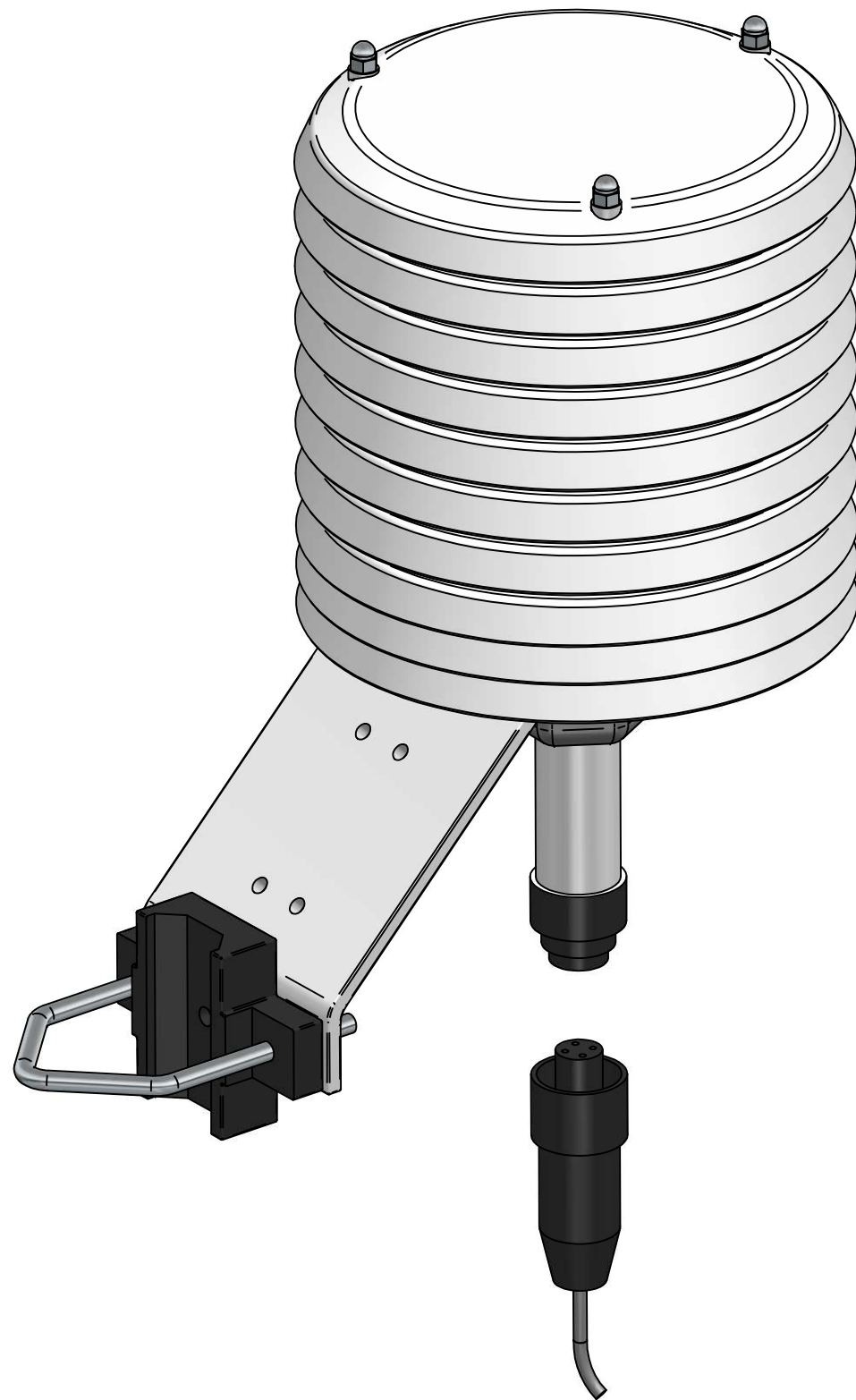
| 1= Yellow | Powersupply – |
|---|---|
| 2= Green | Powersupply + |
| 3= Brown | Temperature 4–20mA |
| 4= White | Humidity 4–20mA |
| 5= Black | Shield |

| | NAME | DATE |
|---|---|---|
| DRAWN | E. Mourik | 5-2-2015 |
| CHECKED | H. Ouadi | 5-2-2015 |
| ENG APPR | | |
| MGR APPR | | |

**OBSERVATOR**
*instruments*

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| SIZE A3 | DWG NO | | REV |
|---|---|---|---|

FILE NAME: OMC-406-422 Connections.dft

| SCALE: | WEIGHT: | SHEET 1 OF 1 |
|---|---|---|