



HUMIDITY AND TEMPERATURE Low power OEM probe

M-TUTA.34

This probe, designed to quantify the *level of relative humidity* and *the temperature* of the ambient atmosphere supplies *variable direct voltage in linear proportion to humidity* and *variable direct voltage in linear proportion to temperature*.

Designed using *MSS Bi-Face* SPSI UPSICAP technology, **the humidity cell equipping this probe is constitute by a micro-system G-TUCN.32.**

The lower face of the substrate houses the temperature sensor, the processing-transmission-linearization analog circuits and stabilized power supply.

The humidity-sensitive face is covered with a high-efficiency atmospheric filter to eliminate condensation-related electrical effects.

The surface electrode of the humidity cell directly in contact with water vapor, is connected to the ground (0V) to ensure shielding against surrounding electrical fields and to eliminate any current leakage liable to affect measurement accuracy.

Exclusive SPSI MSS Bi-Face technology

Operating 0% – 100% RH, -30° to +85°C

High precision and high reliability

Linear from 0 % RH to 100 % RH, -40° to +85° C

Ultra fast humidity response

Additional atmospheric filter (option)

DC 6V to 24V (option 40V)

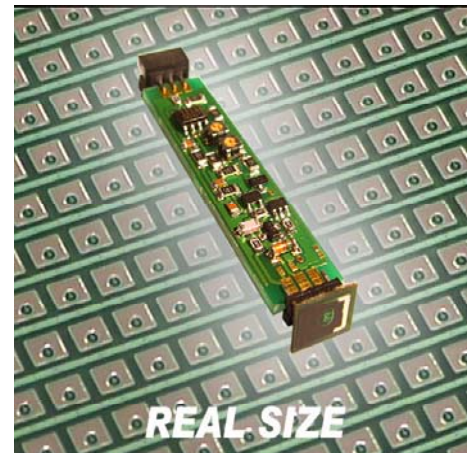
Power consumption < 0.7 mW

Fully interchangeable without recalibration

Instantaneous desaturation

Best value for money worldwide

Very low cost



MAIN CHARACTERISTICS

- Qualified measurement ranges: 2% RH to 98% RH, -20° C to +80° C
- Humidity time constant: 0.25s - 20s depending on model Rx or Lx
- Operating temperature: -40° C to +100° C
- Linearity 2% - 98% RH, -20°C to +70°C: ± 1.5 % RH, ± 0.25°C
- Humidity desaturation time 100%RH 150h: 2-100s depending on model Rx or Lx
- Output signal humidity: 0 → 5 V
- Output signal temperature: 0 → 5 V
- **Operating supply voltage: 6V to 40V without measurement disturbance**
- **Nominal power use: ≤ 120 μA**
- Basic humidity transfer function: $S_H (V) = 0.05 \cdot RH (\%RH)$
- Basic temperature transfer function: $S_T (V) = 1 + 0.05 \cdot Ta (°C)$
- Standard calibrations: 2.5 V to 50% RH, 2.25 V to 25° C
- Temperature/RH sensitivity: ± 0.05 % RH / °C
- Dimensions: L W H : 60 x 8 x 10 mm³

ORIGINAL TECHNOLOGY UPSICAP – MSS BI-FACE

UPSI product range are based on two fundamental concepts *UPSICAP* and *MSS Bi-Face* elaborated and developed by the *Société d'applications électroniques pour la Physique, la Science et l'Industrie* (international patent <http://www.patentstorm.us/patents/6450026-claims.html>)

The MSS Bi-Face concept incorporates on the same substrate both, the humidity sensor on the main face and electronic device, including connections, on the opposite side.

The humidity cell is not added on the substrate but carried out directly *in situ* .

Accuracy, stability and reliability are improved, connecting the sensor to the acquisition electronic circuit with continuum solid vias excluding link wires or printed circuit.

The surface electrode in contact with water vapor is connected to 0V (ground) provides shielding against surrounding electrical field and its thickness provide high robustness atmospheric filter.

The absence of electrical connections on the sensitive face does away with a barrier irregularity reducing the airborne dust on this side and enhancing reliability in the event mechanical action affecting the cell.

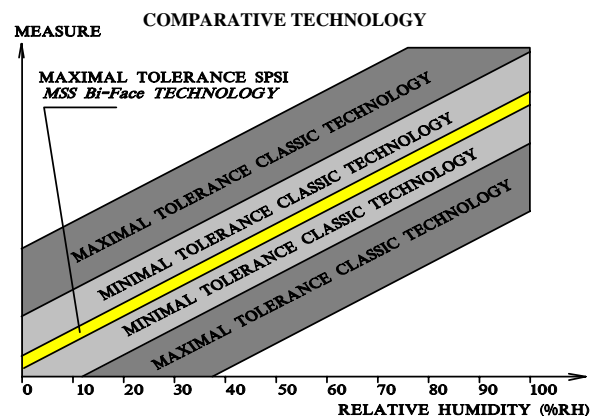
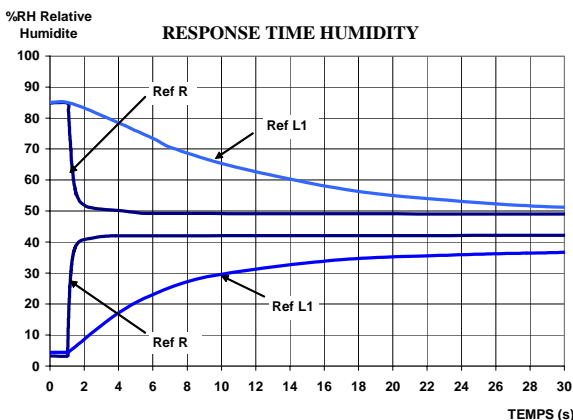
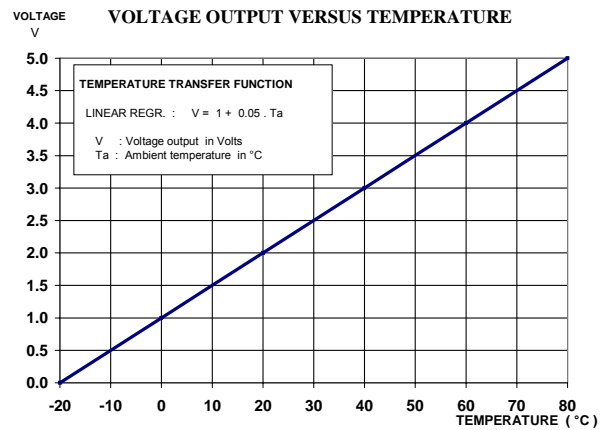
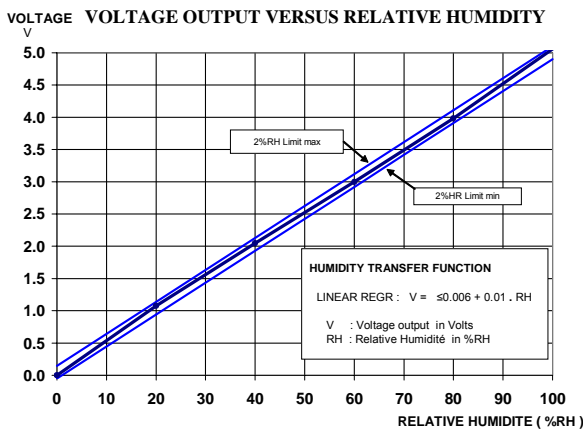
For harsh environment, a complementary filter could be placed on the sensing side.

The additional function (transmitter) component quantity is divided by 2 using some multifunction device increasing the reliability and decreasing area and cost (original electronic concept).

This technology allow to supply an analogic or digital sensor transmitter with 100 μW - 20 μA.

The operating range until 100% RH is insured by a specific treatment (substrate and components impregnation).

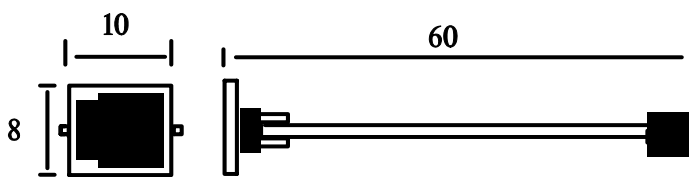
TRANSFER FUNCTIONS



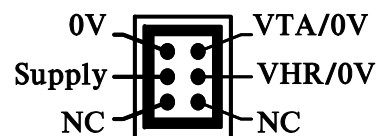
ELECTRICAL AND MEASURING SPECIFICATIONS

Measured or influencing values	Definition	Values			Values
		Min.	Nom.	Max.	
Relative humidity RH	RH measuring range	2	→	98	% RH
	RH operating range	0	→	100	% RH
	Hysteresis		< 1.5		% RH
	Accuracy according to references conditions	2	3		% RH
	Linearity error (2 % RH to 98 % RH)			2	% RH
	Time constant Fast version R	0.25 ↑	0.30	0.40 ↓	sec.
	Version L	30 ↑	40	50 ↓	sec.
	Recovery time (100% RH 150 hours)	2 (R)		100 (L ₁)	sec.
Absolute humidity Specified metrology		0.12		Kg/Kg	
Maximum Metrology outside tolerance		0.35		Kg/Kg	
	Degraded metrology		0.5		Kg/Kg
<i>Output signal</i> V / %RH	Linear voltage	0,01	→	5,0	V
<i>Transfer</i> Output Signal = S _H	S _H (V) = 0,05.RH (% RH) standard calibration 55 % RH Sensitivity	2,6	2,75 0,05	2,9	V V / % RH
Ambient Ta temperature	Range of measurement Ta Accuracy according to reference conditions Linearity error (-10°C à +80°C)	- 20	→ 0,3 0,25	+ 80	° C ° C ° C
<i>Output signal</i> V / °C	Linear voltage	0,01	→	5,0	V
<i>Transfer</i> Output Signal = S _T	S _T (V) = 1 + 0,05 Ta (° C) Standard calibration 25°C Sensitivity	2,2	2,25 0,05	2,3	V V / ° C
Electrical supply	Operating supply voltage Va Nominal current use Power consumption	6	→ 0,7	40 120	V µA mW
<i>Stability</i>	Instantaneous modulation (noise) Sensitivity to power supply voltage Thermal sensitivity	0,005	0,01 < 0,01 0,04	0,05	% RH %EM %RH/°C
Temperature range	Long term storage Specified operating range	- 50 - 30		+ 85 + 85	°C °C

MECHANICAL SPECIFICATIONS - ELECTRICAL CONNECTION



Receptacle : Molex milli-grid 79107-7002



APPLICATIONS

UNITE DE PRODUCTION DE SYSTEMES INDUSTRIELS

S.A.R.L au capital de 660 000 € RCS Créteil B 433 547 643 Siret 433 547 643 00018 Code NAF 321 C

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