

# HM1500LF – Relative Humidity Module



- Small size product
- Product free from Lead, Cr(6+), Cd and Hg
- Humidity calibrated within +/-2% @55%RH
- Typical 1 to 3.6 Volt DC output for 0 to 100% RH at 5Vdc supply
- Ratiometric to voltage supply from 4.75Vdc to 5Vdc
- Patented solid polymer structure

## DESCRIPTION

Based on the rugged HS1101LF capacitive humidity sensor, HM1500LF is a dedicated humidity transducer designed for OEM applications where a reliable and accurate measurement is needed. Direct interface with a micro-controller is made possible with the module's linear voltage output.

## FEATURES

- Full interchangeability
- High reliability and long term stability
- Not affected by water immersion
- Very low temperature dependence
- Suitable for 3 to 10 Vdc supply voltage

### Humidity Sensor Specific features

Instantaneous de-saturation after long periods in saturation phase

Fast response time

Part could be washed with distilled water

(1) Soldering temperature profiles available on request / contact us at [humidity.application@meas-spec.com](mailto:humidity.application@meas-spec.com)

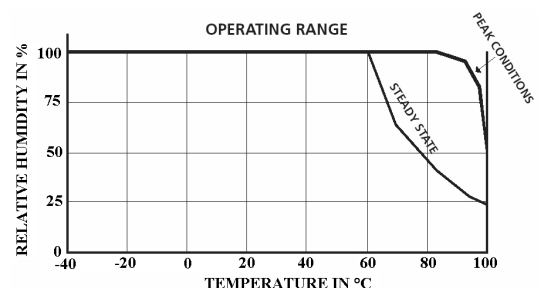
## APPLICATIONS

- Industrial
- Process control
- ...

## PERFORMANCE SPECS

### MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Storage Temperature	Tstg	-30 to 70	°C
Storage Humidity	RHstg	0 to 100	% RH
Supply Voltage (Peak)	Vs	10	Vdc
Humidity Operating Range	RH	0 to 100	% RH
Temperature Operating Range	Ta	-40 to 60	°C



## HM1500LF – Relative Humidity Module

### ELECTRICAL CHARACTERISTICS

(Ta=23°C, Vs=5Vdc +/-5%, RL>1MΩ unless otherwise stated)

Humidity Characteristics	Symbol	Min	Typ	Max	Unit
Humidity Measuring Range	RH	0		100	%RH
Relative Humidity Accuracy (10 to 95% RH)	RH		+/-3	+/-5	%RH
Supply Voltage (regulated at 5Vdc*)	Vs		5		Vdc
Nominal Output @55%RH (at 5Vdc)	Vout	2.42	2.48	2.54	V
Current consumption	Ic		1.4	2	mA
Temperature Coefficient (10 to 50°C)	Tcc		- 0.05	-0.1	%RH/°C
Average Sensitivity from 33% to 75%RH	$\Delta V_{out}/\Delta RH$		+26		mV/%RH
Sink Current Capability (RL=33kΩ)	Is			150	μA
Humidity Hysteresis				+/-1	%RH
Time Constant (at 63% of signal, static) 33% to 75%RH	$\tau$			10	s
Warm up time (electronic)	tw		150		ms
Humidity resolution			0.4		%RH
Output Impedance	Z		70		Ω

\*Maximum power supply ramp up time to Vcc should be less than 4ms.

### TYPICAL PERFORMANCE CURVES

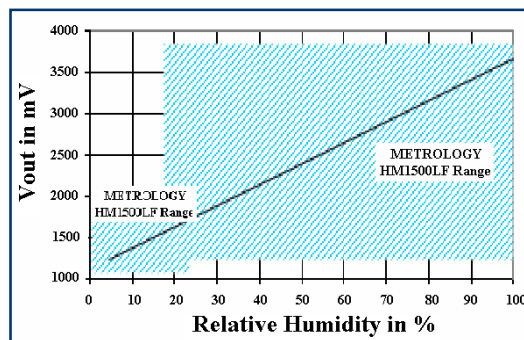
#### HUMIDITY SENSOR

- Measurement conditions

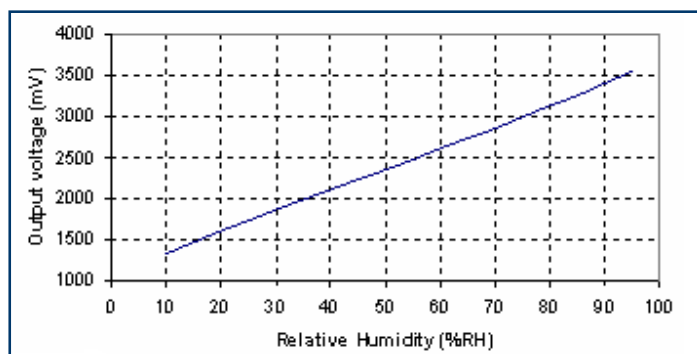
HM1500LF is specified for accurate measurements within 10 to 95% RH.

Excursion out of this range (<10% or >95% RH, including condensation) does not affect the reliability of HM1500LF characteristics.

Dedicated HM15XX products are available for extreme RH conditions (as HM1520 for low dewpoints). Consult MEAS-FRANCE for further information.



- Modeled Signal Output



RH (%)	Vout (mV)	RH (%)	Vout (mV)
10	1325	55	2480
15	1465	60	2605
20	1600	65	2730
25	1735	70	2860
30	1860	75	2990
35	1990	80	3125
40	2110	85	3260
45	2235	90	3405
50	2360	95	3555

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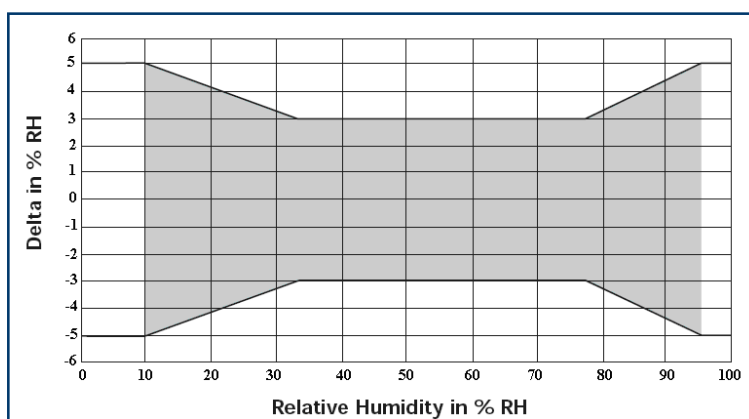
### LINEAR EQUATIONS:

- $V_{out} = 25.68RH + 1079$
  - $RH = 0.03892 V_{out} - 42.017$
- (With  $V_{out}$  in mV and RH in %)

### POLYNOMIAL EQUATIONS:

- $V_{out} = 9E^{-4} RH^3 - 1.3E^{-1} RH^2 + 30.815 RH + 1030$
  - $RH = -1,91E^{-9} V_{out}^3 + 1,33E^{-5} V_{out}^2 + 9,56E^{-3} V_{out} - 2,16E^{+1}$
- (With  $V_{out}$  in mV and RH in %)

- **Error Budget at 23°C**



### TEMPERATURE COMPENSATION:

$$RH_{compensated} = RH_{actualatT} + (T - 23) \times 0.05$$

(With T: Temperature in °C and RH: Relative Humidity in %)

## QUALIFICATION PROCESS

### RESISTANCE TO PHYSICAL AND CHEMICAL STRESSES

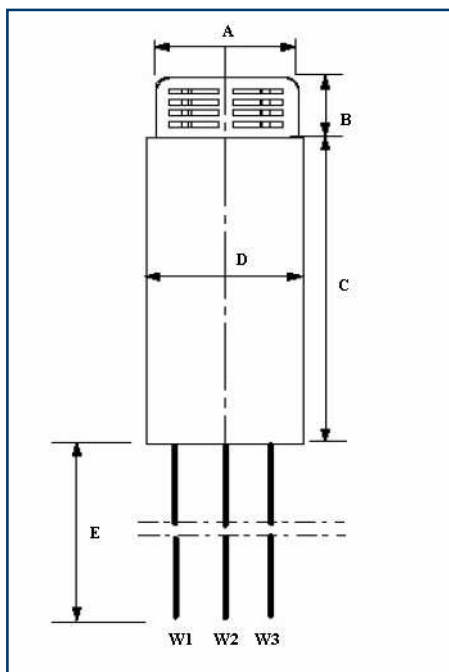
- HM1500LF has passed through qualification processes of MEAS-FRANCE including vibration, shock, storage, high temperature and humidity, ESD.
- Additional tests under harsh chemical conditions demonstrate good operation in presence of salt atmosphere, SO<sub>2</sub> (0.5%), H<sub>2</sub>S (0.5%), O<sub>3</sub>, NO<sub>x</sub>, NO, CO, CO<sub>2</sub>, Softener, Soap, Toluene, acids (H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub>, HCl), HMDS, Insecticide, Cigarette smoke, this is not an exhaustive list.
- HM1500LF is not light sensitive.

### SPECIFIC PRECAUTIONS

- HM1500LF is protected against reversed polarity.
- If you wish to use HM1500LF in a chemical atmosphere not listed above, consult us.

## HM1500LF – Relative Humidity Module

### PACKAGE OUTLINE



Dim	Min (mm)	Max (mm)
A	9.75	10.25
B	4.00	4.50
C	53	55
D	10.9	11.4
E*	200	250

\* Specific length available on request

Wire	Color	Function
W1	White	Ground
W2	Blue	Supply Voltage
W3	Yellow	Humidity Output Voltage

### ORDERING INFORMATION

**HPP805A031 (MULTIPLE PACKAGE QUANTITY OF 10 PIECES)**  
**HM1500LF – HUMIDITY ANALOG VOLTAGE OUTPUT**

Sample kit of HM1500LF is available through MEASUREMENT SPECIALTIES web site:  
<http://www.meas-spec.com/humidity-sensors.aspx>

**Customer Service contact details**

Measurement Specialties, Inc - MEAS France  
Impasse Jeanne Benozzi  
CS 83 163  
31027 Toulouse Cedex 3  
FRANCE  
Tél: +33 (0)5 820 822 02  
Fax: +33(0)5 820 821 51  
Sales: [humidity.sales@meas-spec.com](mailto:humidity.sales@meas-spec.com)

## HM1500LF – Relative Humidity Module

Revision	Comments	Who	Date
C	Power supply ramp up time specification added	C.EISMANN	September 06
D	HPP Number updated, RoHS logo added	D. LE GALL	September 07
E	Standardized datasheet format and Current consumption lowering updated	D. LE GALL	April 08
F	New MEAS template, MEAS-France contact details updated	D. LE GALL-ZIRILLI	October 12

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