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

surem

- Ratiometric to voltage supply from 4.75Vdc to 5Vdc
- Patented solid polymer structure

### DESCRIPTION

RoHS

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

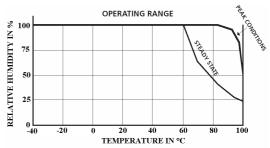
Instantaneous de-saturation after long periods in saturation phase Fast response time Part could be washed with distilled water

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

## 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	Та	-40 to 60	C



#### HM1500LF HPC062\_F

# APPLICATIONS

- Industrial
- Process control
- ...



#### **ELECTRICAL CHARACTERISTICS**

(Ta=23℃, Vs=5Vdc +/-5%, R L>1MΩ unless otherwise stated)

Humidity Characteristics	Symbol	Min	Тур	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	lc		1.4	2	mA
Temperature Coefficient (10 to 50°C)	Тсс		- 0.05	-0.1	%RH/℃
Average Sensitivity from 33% to 75%RH	ΔVout/ΔRH		+26		mV/%RH
Sink Current Capability ( $R_L=33k\Omega$ )	ls			150	μA
Humidity Hysteresis				+/-1	%RH
Time Constant (at 63% of signal, static) 33% to 75%RH	τ			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**

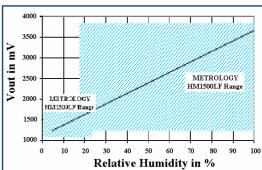
#### **HUMIDITY SENSOR**

#### • Measurement conditions

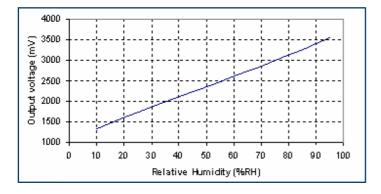
HM1500LF is specified for accurate measurements within 10 to 95% RH.

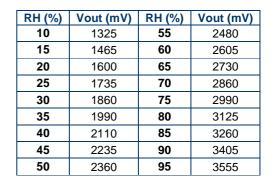
Excursion out of this range (<10% or >95% RH, including condensation) does not affect the reliability of HM1500LF characteristics.

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



#### Modeled Signal Output





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LINEAR EQUATIONS:

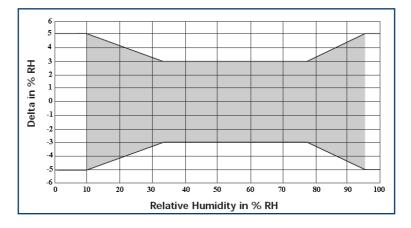
- V<sub>out</sub> = 25.68RH + 1079
- RH = 0.03892 V<sub>out</sub> 42.017
- (With Vout in mV and RH in %)

#### POLYNOMIAL EQUATIONS:

- $V_{out} = 9E^{-4}RH^{3} 1.3E^{-1}RH^{2} + 30.815RH + 1030$
- RH =  $-1,91E^{-9} V_{out}^{3} + 1,33E^{-5} V_{out}^{2} + 9,56E^{-3} V_{out} 2,16E^{+1}$

(With V<sub>out</sub> in mV and RH in %)

### • Error Budget at 23℃



#### TEMPERATURE COMPENSATION:

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

(With T: Temperature in C and RH: Relative Humidit y 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, SO2 (0.5%, H2S (0.5%), 03, NOx, NO, CO, CO2, Softener, Soap, Toluene, acids (H2SO4, HNO3, HCI), HMDS, Insecticide, Cigarette smoke, this is not an exhaustive list.
- HM1500LF is not light sensitive.

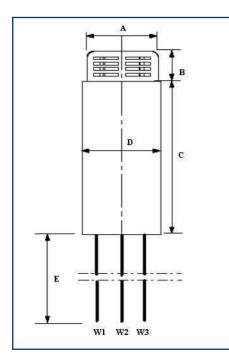
#### SPECIFIC PRECAUTIONS

- 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**



	1	l
Dim	Min (mm)	Max (mm)
Α	9.75	10.25
В	4.00	4.50
С	53	55
D	10.9	11.4
E*	200	250

\* Specific lenght 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: <u>http://www.meas-spec.com/humidity-sensors.aspx</u>

#### **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: <u>humidity.sales@meas-spec.com</u>



# HM1500LF – Relative Humidity Module

Revision	Comments	Who	Date
С	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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