



# RELATIVE HUMIDITY MODULE

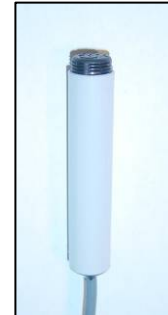
# HM1520LF

Compliant with RoHS recommendations

Based on the rugged HS1101LF capacitive humidity sensor, HM1520LF is a dedicated humidity transducer designed for measurements at low humidity. Direct measurement of dew point or water concentration can be easily obtained in really cost effective conditions. Direct interface with a micro-controller is made possible with the module's linear voltage output.

## MAIN FEATURES

- Tubular form for through wall mounting
- Product free from Lead, Cr(6+), Cd and Hg
- Not affected by water condensation
- Full interchangeability
- **Typical 1 to 1.6 Volt DC output for 0 to 20% RH at 5 V DC supply**
- Calibrated, linear voltage for easy electronic interface
- Controlled temperature dependency
- Ratiometric to voltage supply



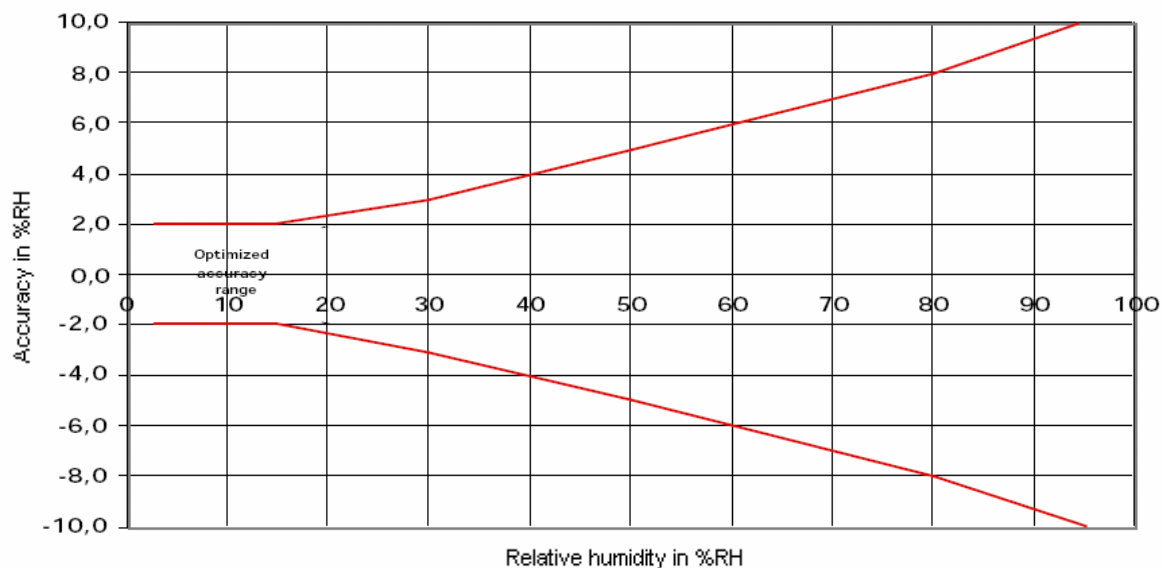
## HUMIDITY SENSOR SPECIFIC FEATURES

- No affected by long period at low humidity values
- Patented solid polymer structure
- High resistance to chemical
- Fast response time

## MAXIMUM RATINGS

Ratings	Symbol	Value	Unit
Storage Temperature	Tstg	-30 to 70	°C
Storage Humidity Range	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

Accuracy of HM1520LF when used from 1 to 95%RH



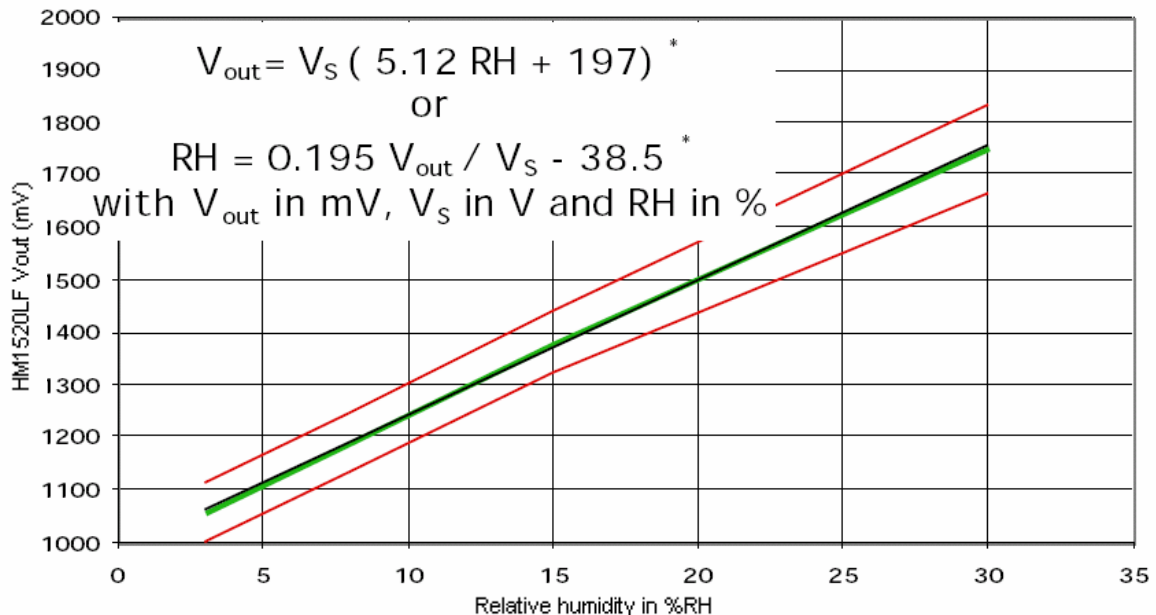
# CHARACTERISTICS

( $V_S=5.0V_{dc}$ ,  $R_L > 1M\Omega$  unless otherwise stated)

Characteristics	Symbol	Min	Typ	Max	Unit
Humidity measuring range / $T_a$ -40 to 60°C	RH	0		100	%RH
Relative Humidity Accuracy (1-20%) at 23°C			±2	±3	%RH
Relative Humidity Accuracy at 55% RH at 23°C			±5		%RH
Voltage Supply (regulated at 5Vdc)*	$V_{CC}$	4.75	5	5.25	$V_{dc}$
Nominal Output @10%RH / $T_a$ 25°C	$V_{out}$	1.17	1.24	1.31	V
Current Consumption	$I_{CC}$		2.8	4	mA
Temperature coefficient (10 to 50°C and 1 to 20%RH)	$T_{CC}$		-0.05	-0.1	%RH/°C
Humidity Average Sensitivity from 5% to 10% RH	$\Delta mV/RH$		+26		mV/%RH
Response time ( at 63% of signal) from 5% to 10% RH	$\tau$			10	s
Humidity Hysteresis				+/-1	%RH
Output impedance	Z		70		$\Omega$
Sink current capability ( $R_L = 33 k\Omega$ )	$I_S$			150	$\mu A$
Warm up time (electronic)	$t_w$		150		ms
Humidity Resolution			0.4		%RH
Long Term Stability			0.5		%RH/Yr

\*Maximal power supply ramp up time to VCC should be less than 4 ms.

## HM1520LF Preliminary Specification when used from 1 to 30%RH



- Those equations can be used above 30% RH and allow to obtain an over all accuracy as described in page one of this document in all the humidity measuring range
- Temperature (in the range 0 to 50°C) does not affect HM1520LF measurement when used from 1 to 30% RH. No temperature compensation is required.

**Signal output from 1 to 20% RH at 23°C :**

<b>RH(%)</b>	1	2	3	4	5	6	7	8	9	10
<b>Vout(mV)</b>	1013	1038	1064	1089	1115	1141	1166	1192	1217	1243
<b>RH(%)</b>	11	12	13	14	15	16	17	18	19	20
<b>Vout(mV)</b>	1269	1294	1320	1346	1371	1397	1422	1448	1474	1499

With  $V_s = 5.0$  Volts DC

Calibration data are **traceable to NIST** standards through CETIAT laboratory.

**IMPORTANT NOTICE :** HM1520LF is based on HS1101LF capacitive sensor and thus is fully useable on a large range of relative humidity ( 1 to 99% RH). In that range, HM1520LF presents a typical accuracy of +/-5% RH at 55% RH.)

However HM1520LF is a dedicated module for humidity measurements at low Relative Humidity levels.

Thus, HM1520LF is also well adapted to measure water concentrations (ppm) or low dew points when associated with an ambient temperature probe.

HM1520LF features an optimized accuracy for **water concentration below 6000 ppm water or 0°C dew point at 23°C** (equivalent to 20% RH).

**TYPICAL OUTPUT of HM1520LF when measuring water concentration at ambient temperature of 23°C :**

<b>ppm</b>	275	550	825	1100	1375	1650	1925	2200	2470	2750
<b>Vout(mV)</b>	1013	1038	1064	1089	1115	1141	1166	1192	1217	1243
<b>ppm</b>	3025	3300	3570	3850	4120	4395	4670	4945	5220	5495
<b>Vout(mV)</b>	1269	1294	1320	1346	1371	1397	1422	1448	1474	1499

$$\text{ppm}_{\text{water}} = 10.75 V_{\text{out}} - 10615 \text{ with } V_{\text{out}} \text{ in mVolts}$$

**TYPICAL OUTPUT of HM1520LF when measuring dew point at ambient temperature of 23°C :**

<b>°C</b>	-36	-29	-24	-21	-18.5	-16	-14.5	-13	-11.5	-10
<b>Vout(mV)</b>	1013	1038	1064	1089	1115	1141	1166	1192	1217	1243
<b>°C</b>	-9	-7.8	-6.8	-5.8	-4.9	-4.1	-3.2	-2.5	-1.6	-1.1
<b>Vout(mV)</b>	1269	1294	1320	1346	1371	1397	1422	1448	1474	1499

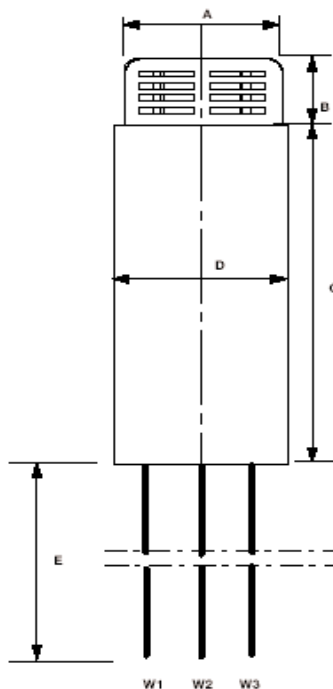
## RESISTANCE TO PHYSICAL AND CHEMICAL STRESS

- HM1520LF has passed through qualification processes of HUMIREL 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, a non exhaustive list.
- HM15200LF is not light sensitive.

## SPECIFIC PRECAUTIONS

- HM1520LF is protected against reversed polarity.
- If you wish to use HM1520LF in a chemical atmosphere not listed above, consult us.

## PACKAGE OUTLINE



\* Specific length available on request

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

Wire	Color	Function
W1	White	GROUND
W2	Blue	SUPPLY VOLTAGE
W3	Yellow	OUTPUT VOLTAGE

**ORDERING INFORMATION (MULTIPLE PACKAGE QUANTITY OF 10 PARTS)**  
**HM1520LF: HUMIDITY ANALOG VOLTAGE OUTPUT MODULE**  
**ORDERING REFERENCE: HPP805C031**

**SAMPLE KIT OF HM1520LF  
 IS AVAILABLE THROUGH  
 HUMIREL WEB SITE**

[www.humirel.com](http://www.humirel.com)  
 email : [sales@humirel.com](mailto:sales@humirel.com)

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