

# HM1520LF – Relative Humidity Module



- Tubular form for through wall mounting
- Product free from Lead, Cr(6+), Cd and Hg
- Calibrated, linear voltage for easy electronic interface
- Typical 1 to 1.6 Volt DC output for 0 to 20% RH at 5Vdc supply
- Ratiometric to voltage supply
- Patented solid polymer structure



## DESCRIPTION

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.

## FEATURES

- Full interchangeability
- Not affected by water immersion
- Controlled temperature dependency

### Humidity Sensor Specific features

Not affected by long period at low humidity values  
High resistance to chemical  
Fast response time

## APPLICATIONS

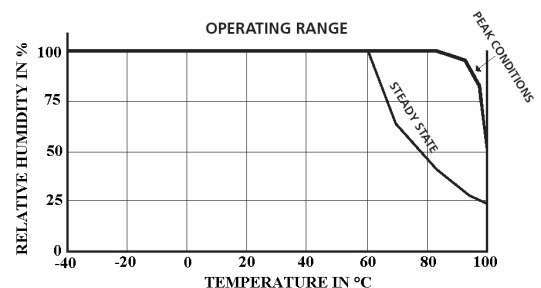
- Low Humidity
- Meteorology
- ...

## 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   |

**Peak conditions:** less than 10% of the operating time.



## HM1520LF – Relative Humidity Module

### ELECTRICAL CHARACTERISTICS

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

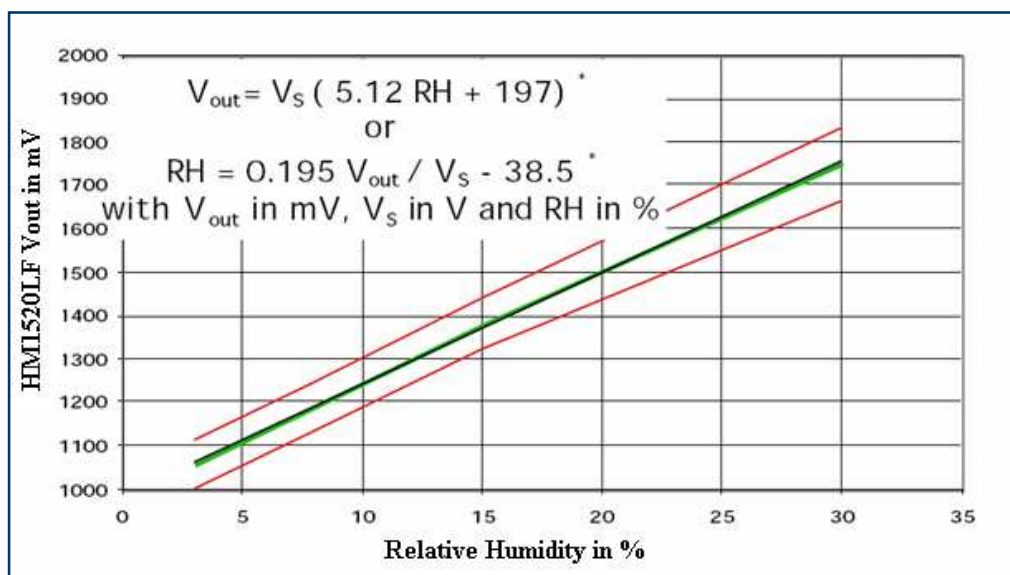
| Humidity Characteristics                             | Symbol    | Min  | Typ    | Max  | Unit   |
|--|-----------|------|--------|------|--------|
| Humidity Measuring Range / Ta -40 to 60°C            | RH        | 0    |        | 100  | %RH    |
| Relative Humidity Accuracy (1 to 20% RH) at 23°C     | RH        |      | +/-2   | +/-3 | %RH    |
| Relative Humidity Accuracy @55% RH at 23°C           | RH        |      | +/-5   |      | %RH    |
| Supply Voltage (regulated at 5Vdc*)                  | Vs        | 4.75 | 5      | 5.25 | Vdc    |
| Nominal Output @10%RH (Ta = 25°C)                    | Vout      | 1.17 | 1.24   | 1.31 | V      |
| Current Consumption                                  | Ic        |      | 1.4    | 2    | mA     |
| Temperature Coefficient (10 to 50°C and 1 to 20% RH) | Tcc       |      | - 0.05 | -0.1 | %RH/°C |
| Humidity Average Sensitivity from 5% to 10%RH        | ΔVout/ΔRH |      | +26    |      | mV/%RH |
| Sink Current Capability (RL=33kΩ)                    | Is        |      |        | 150  | μA     |
| Humidity Hysteresis                                  |           |      |        | +/-1 | %RH    |
| Time Constant (at 63% of signal, static) 5% to 10%RH | τ         |      |        | 10   | s      |
| Warm Up Time (electronic)                            | tw        |      | 150    |      | ms     |
| Humidity Resolution                                  |           |      | 0.4    |      | %RH    |
| Long Term Stability                                  |           |      | 0.5    |      | %RH/yr |
| Output Impedance                                     | Z         |      | 70     |      | Ω      |

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

### TYPICAL PERFORMANCE CURVES

#### HUMIDITY SENSOR

- 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 4 of this document in all 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.

## HM1520LF – Relative Humidity Module

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

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

With Vs = 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

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

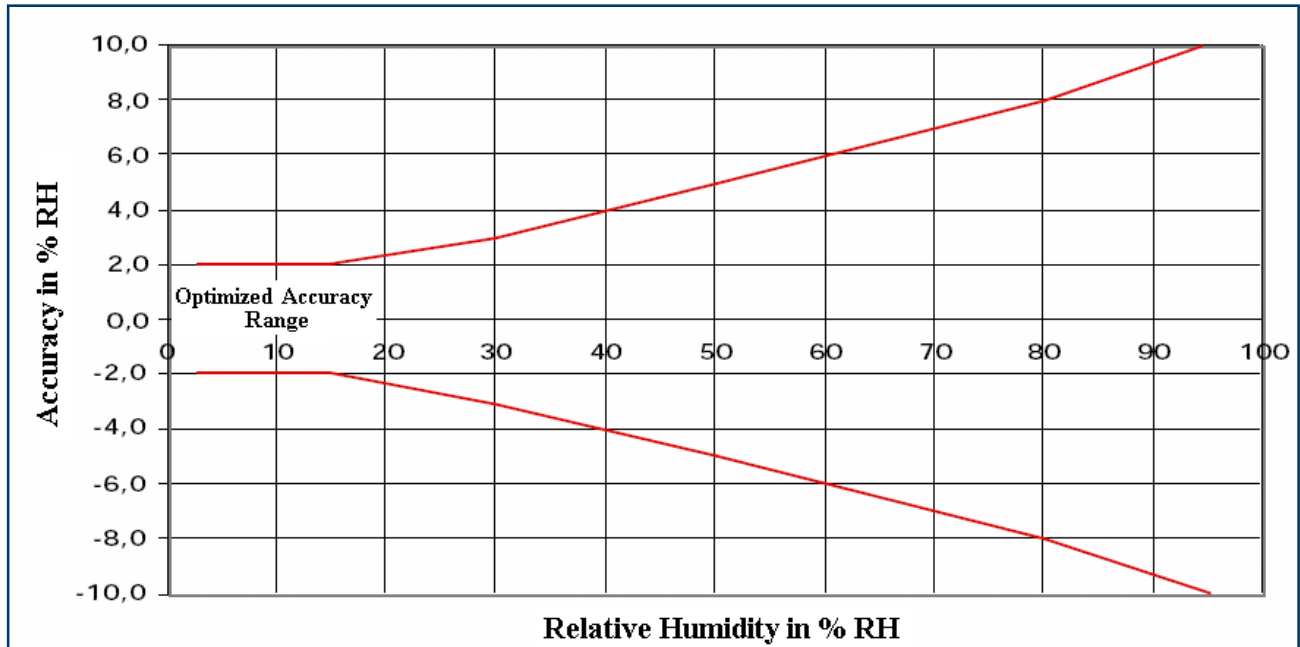
$$\text{ppm}_{\text{water}} = 10.75 V_{\text{out}} - 10615 \text{ with } V_{\text{out}} \text{ in mV}$$

- Typical Output of HM1520LF when measuring dew point at ambient temperature of 23°C

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

## HM1520LF – Relative Humidity Module

- Accuracy of HM1520LF when used from 1% to 95% RH



## QUALIFICATION PROCESS

### RESISTANCE TO PHYSICAL AND CHEMICAL STRESSES

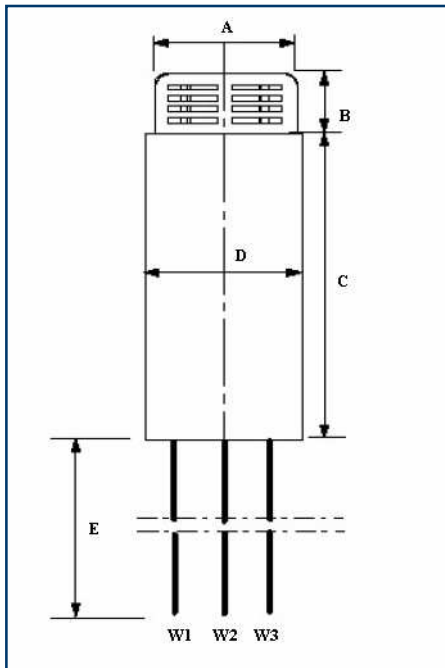
- HM1520LF has passed through qualification processes of MEAS-FRANCE including vibration, shock, storage, high temperature and humidity, ESD.
- Additional tests under harsh chemical conditions demonstrate good operation in presence of salt atmosphere, SO<sub>2</sub> (0.5%), H<sub>2</sub>S (0.5%), O<sub>3</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.
- HM1520LF 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.

## HM1520LF – Relative Humidity Module

### PACKAGE OUTLINE



| Dim       | Min (mm) | Max (mm) |
|-----------|----------|----------|
| <b>A</b>  | 9.75     | 10.25    |
| <b>B</b>  | 4.00     | 4.50     |
| <b>C</b>  | 53       | 55       |
| <b>D</b>  | 10.9     | 11.4     |
| <b>E*</b> | 200      | 250      |

\* Specific length available on request

| Wire      | Color  | Function                |
|-----------|--------|-------------------------|
| <b>W1</b> | White  | Ground                  |
| <b>W2</b> | Blue   | Supply Voltage          |
| <b>W3</b> | Yellow | Humidity Output Voltage |

### ORDERING INFORMATION

**HPP805C031 (MULTIPLE PACKAGE QUANTITY OF 10 PIECES)**  
**HM1520LF – HUMIDITY ANALOG VOLTAGE OUTPUT MODULE**

## HM1520LF – Relative Humidity Module

| Revision | Comments   | Who                | Date       |
|----------|--|--------------------|------------|
| A        | Characteristics updated  | D. LE GALL         | January 08 |
| B        | Standardized datasheet format and Current consumption lowering updated | D. LE GALL         | April 08   |
| C        | New MEAS template, MEAS-France contact details updated                 | D. LE GALL-ZIRILLI | October 12 |

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