



RELATIVE HUMIDITY MODULE

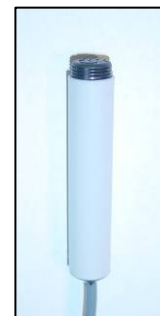
HM1520LF

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



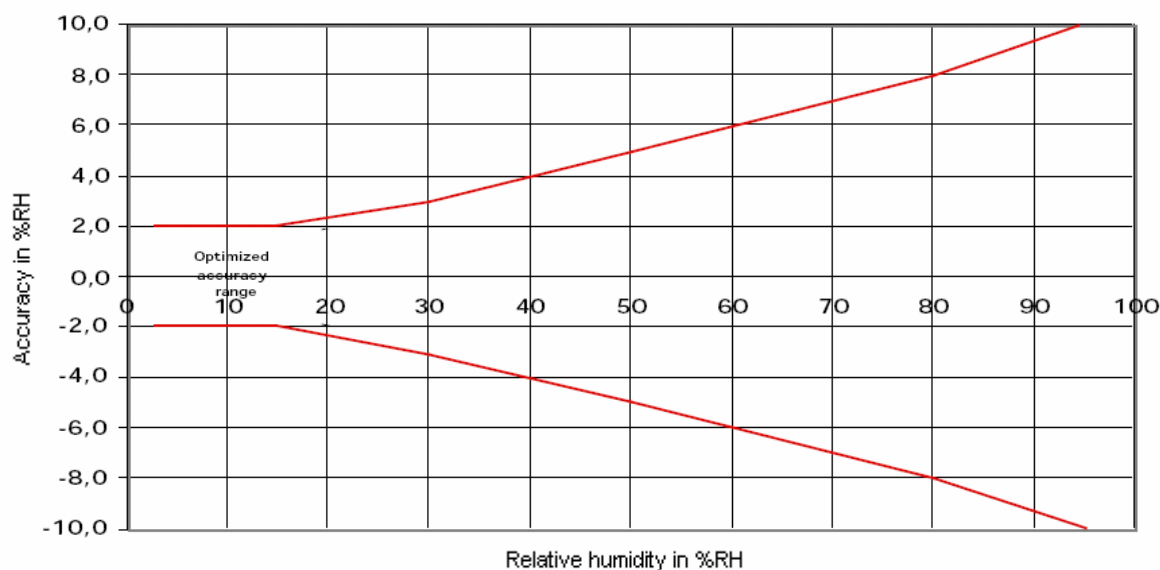
HUMIDITY SENSOR SPECIFIC FEATURES

- 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



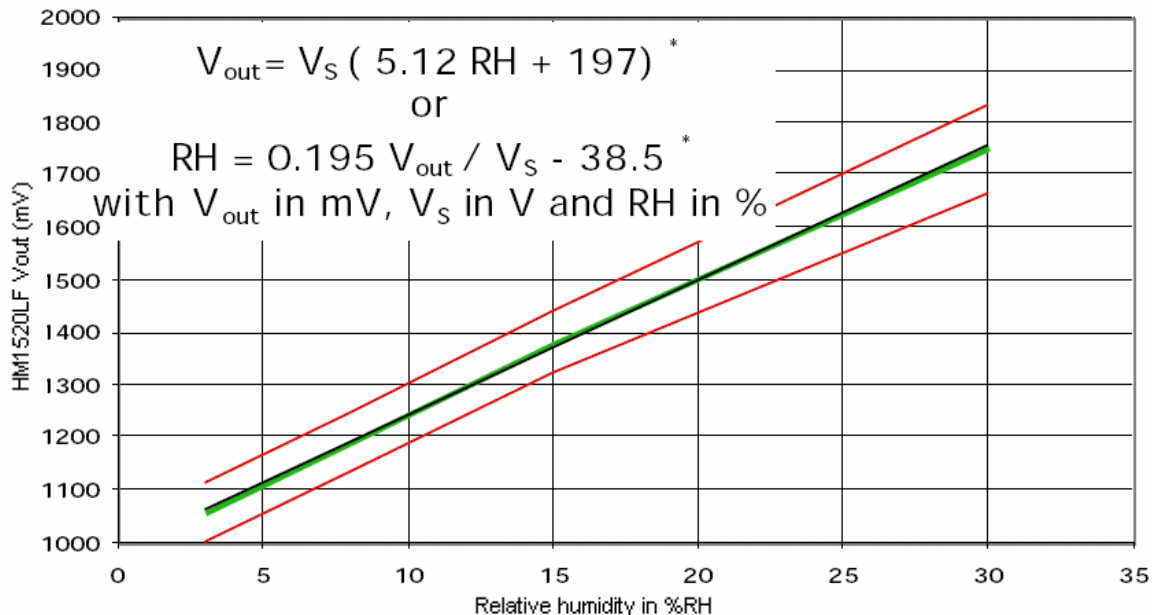
CHARACTERISTICS

($V_S=5.0V_{dc}$, $R_L > 1M\Omega$ 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 | τ | | | 10 | s |
| Humidity Hysteresis | | | | +/-1 | %RH |
| Output impedance | Z | | 70 | | Ω |
| Sink current capability ($R_L = 33 k\Omega$) | I_S | | | 150 | μA |
| 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 :

| 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 $V_s = 5.0$ 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 :

| 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 |

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

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

| °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 |
| °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 |

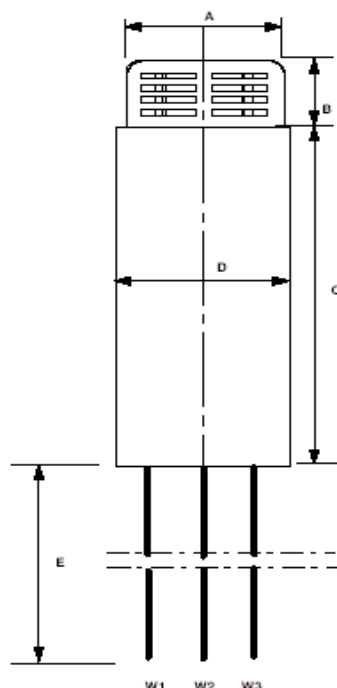
RESISTANCE TO PHYSICAL AND CHEMICAL STRESS

- 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, SO₂(0.5%), H₂S (0.5%), O₃, NO_x, NO, CO, CO₂, Softener, Soap, Toluene, acids (H₂SO₄, HNO₃, 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
email : sales@humirel.com

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