

Humidity Sensor

CE

Model HU-224/225

RoHS



- Ultra fast response cross-linked bulk polymer capacitive sensing element
- Proprietary hydrophobic and oleophobic ePTFE filter to protect the sensing element from condensation, fog, salt air, pollutants and other contaminants
- Rugged steel enclosure and thick-walled aluminum probe rated NEMA-4 (IP-65) to withstand weather extremes
- NIST traceable $\pm 2\%$ RH or $\pm 3\%$ RH calibration accuracy
- Two temperature compensated output versions, 4-20 mA 2-wire or field selectable 0-5 VDC/0-10 VDC
- Conforms to EMC and RoHS standards
- Two enclosure types: NEMA-4 (IP-65) duct mount or aesthetically appealing ABS plastic wall mount

The HU-224/225 is an extremely fast, stable and accurate humidity transducer designed for harsh environments. The polymer capacitance sensor is protected with an ePTFE (expanded Teflon) filter media. The Teflon protected cross-linked capacitive humidity sensor is not affected by prolonged exposure to condensing humidity, harsh environments, contaminants, fog or other extreme environmental conditions. Each unit is individually calibrated in an environmental test chamber to meet or exceed NIST traceable $\pm 2\%$ or $\pm 3\%$ accuracies. The HU-224/225 is temperature compensated for -30°F (-35°C) to $+130^{\circ}\text{F}$ (55°C) operation with negligible error. For space humidity, an aesthetically appealing ABS enclosure which may be flush mounted or fits a standard 2" x 4" handy box is available, and for duct humidity applications, a rugged NEMA-4 (IP-65) steel enclosure with external mounting bracket is also available. Two enclosure types, field selectable outputs, fully temperature compensated NIST traceable accuracy, non-interacting zero and span adjustments, short circuit and reverse polarity protected output, and a liberal five year warranty are some of the features which make the HU-224/225 the industry's highest performance, most reliable humidity sensor.

**MAMAC SYSTEMS**[®]

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HU-224/225

The HU-224/225 incorporates a cross-linked bulk polymer capacitive humidity sensor which is immune to most contaminants and at the same time provides a stable, repeatable, accurate humidity measurement with negligible hysteresis. The sensing element is not affected by condensation. In fact, the probe may be immersed in distilled water without degrading the calibration accuracy. The HU-224/225 utilizes sophisticated integrated circuits to provide a high level, fully conditioned, and temperature compensated humidity output.

On VDC output units two additional field selectable options are available; dual outputs 0-5 or 0-10 VDC, and dual unregulated supply voltages 12-35 VAC or 12-40 VDC. By merely moving a switch, one can select the desired output for the specific application. As far as supply voltage is concerned, the unit automatically configures for AC or DC and no field selection is necessary. Another feature is that the output is fully protected from short circuit to ground, or if the supply voltage is applied by mistake to the output. Past experience demonstrates that field related wiring problems do occur. Instead of denying this fact, this protection circuit is designed in to ensure trouble-free start-up. The VDC output unit is also designed to handle low impedance circuits. In fact, the unit can drive up to 1K ohm minimum. In this way, multiple controllers, indicators, or other devices can be paralleled to the output without performance degradation.

The mA output units function over a wide unregulated supply voltage range: 12-40 VDC without any effect on calibration or performance. The unit has reverse polarity protection built in. As a result, it is next to impossible to damage the unit by wiring incorrectly.

By using sophisticated low dropout voltage regulators and CMOS integrated circuits, the mA output unit can drive very high output impedance. In fact, with only 12 VDC supply, the unit can drive 250 ohms. At 40 VDC, the unit is capable of handling up to a

1500 ohm load. In this way, the output loop can be tied in series to multiple controllers, indicators, and other devices without degrading the performance.

The humidity sensor is protected by an ePTFE (expanded Teflon) filter media that incorporates a proprietary process of expanding or stretching an ultra thin Teflon sheet during the manufacturing process to create less than 1.0 micron (0.000039 inch) pores or holes. The hydrophobic and oleophobic characteristics of Teflon force moisture, condensation and other contaminants to form a bubble larger than the pore size, and the surface tension of the Teflon stops the water or other contaminants from passing through the filter media, thereby protecting the sensing element. However, air with absorbed moisture can easily penetrate the filter media. NIST traceable humidity standards are utilized to calibrate and certify the HU-224/225. Calibration data on each unit is archived digitally for SPC and QC purposes. All automated calibration systems are networked and data is available online to numerous individuals at the same time. In this way, extremely high standards of quality and calibration integrity are maintained.

The HU-224/225 incorporates a rugged NEMA 4 (IP-65) fully gasketed, dust proof and splash proof enclosure for monitoring duct humidity or an aesthetically appealing ABS plastic wall mount enclosure for monitoring space humidity. The HU-224 duct enclosure has an external mounting bracket to facilitate field installation. A ½" (.875"/22.25 mm diameter) knock-out for conduit connection is also provided. A liquid tight cable connector is supplied if the unit is not being hard wired. The HU-225 wall mount enclosure may be flush mounted on any flat surface or fits a standard 2" x 4" handy box. Louvers are provided on the top and bottom of the enclosure to ensure ample air flow for fast response. Both enclosure options also have additional features for ease of installation including unpluggable terminal block, easily accessible zero and span trimmers, and conveniently located switches for field selection.

HU-224/225

HUMIDITY TRANSDUCER SPECIFICATIONS:

Accuracy*: $\pm 2\%$ / $\pm 3\%$ RH
Range: 0-100% RH
Hysteresis: $\pm 1\%$
Supply Voltage: 12-40 VDC
 12-35 VAC (VDC output units only)
Supply Current: VDC Units - 10 mA max.
 mA Units - 20 mA max.
Compensated Temp Range: -30°F to 130°F
 (-35°C to 55°C)
Load Impedance: 1.5K ohms max. at 40 VDC
 (mA output units)
 1K ohms min.
 (VDC output units)

* Includes non-linearity and non-repeatability

GENERAL SPECIFICATIONS:

Environmental: 10-90% RH Non-Condensing
Enclosure: 18 Ga C. R. Steel NEMA 4 (IP-65)
 or ABS Plastic
Finish: Baked on enamel-PMS2GR88B or
 off-white
Termination: Unpluggable screw terminal block
Wire Size: 12 Ga max.
Weight: Duct mount - 1.0 lbs. (.45 kg)
 Wall mount - 0.5 lbs. (.25 kg)

CONFORMANCE & TESTING:

RoHS Compliant

EMC Testing:

BS EN 55022:1998, BS EN 55024:1998,
 EN 61000-3-3, EN 61000-4-2,
 EN 61000-4-3, EN 61000-4-4,
 EN 61000-4-5, EN 61000-4-6,
 EN 61000-4-11

ORDERING INFORMATION: HU-

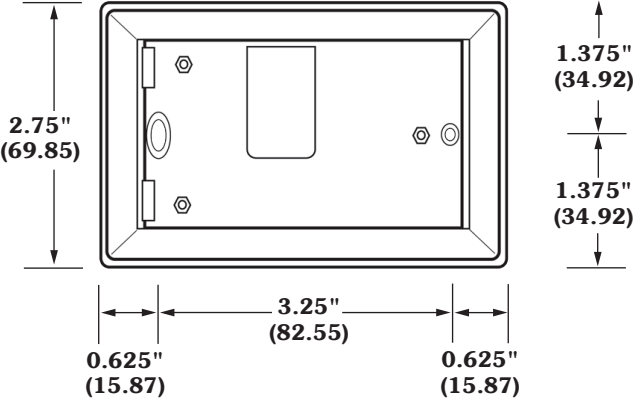
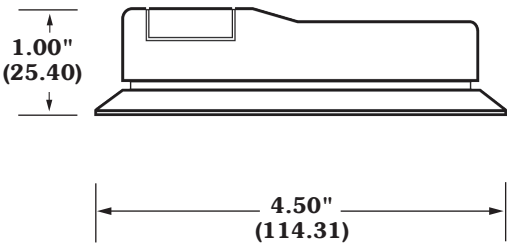
Packaging	Accuracy	Output
224 (duct mount)	$\pm 2\%$	mA (4-20 mA 2-wire)
225 (wall mount)	$\pm 3\%$	VDC (0-5 VDC or 0-10 VDC field selectable)

Example: HU-224-2-mA Duct Humidity Transducer, $\pm 2\%$ RH accuracy with 4-20 mA output.

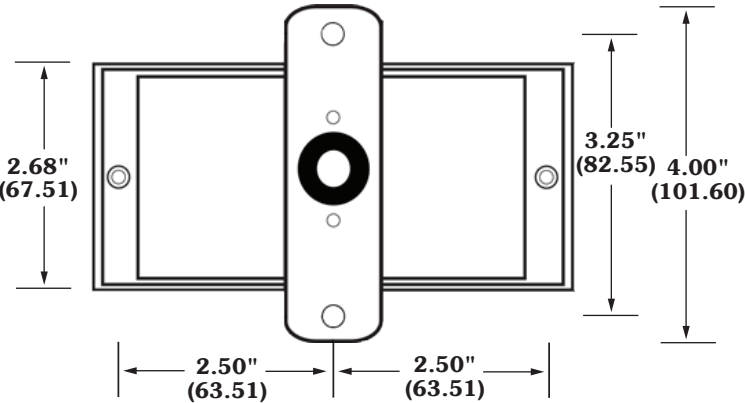
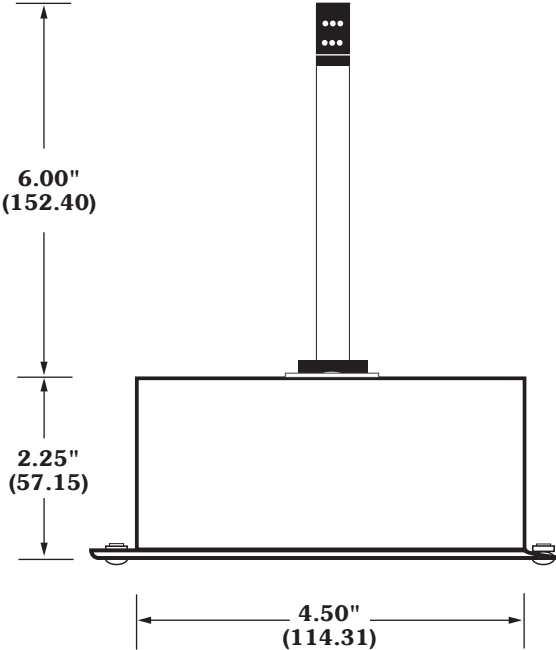
CAUTION: Do not use in explosive/hazardous environment or with flammable/combustible media.

HU-224/225

Wall Mount

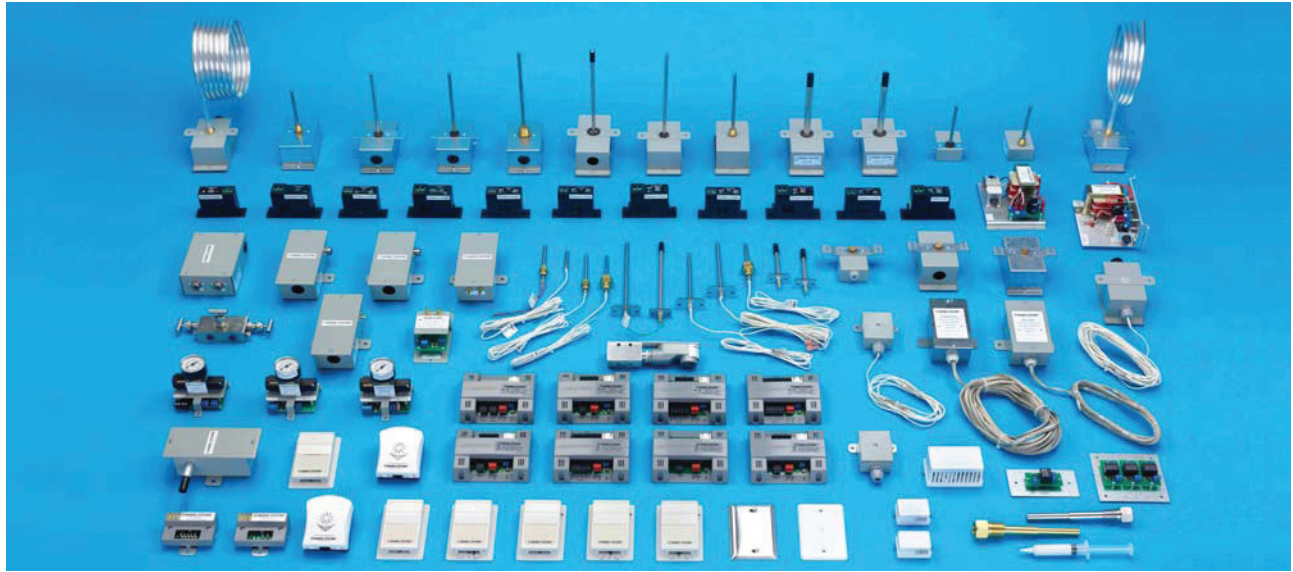


Duct Mount



(mm)

HU-224/255



MAMAC Systems is the leading global manufacturer of sensors, transducers, control peripherals and web browser based IP appliances. MAMAC products are used for HVAC and environmental controls, remote monitoring, alarming, energy metering and industrial automation.

All MAMAC products are manufactured in the USA.

WARRANTY: MAMAC Systems, Inc. and its subsidiaries (hereinafter referred to as MAMAC Systems) warrants its products to be free of defects in material and workmanship for a period of five (5) years from date of shipment. If a unit is malfunctioning, it must be returned to the factory for evaluation. A return authorization number (RMA) will be issued by the customer service department and this number must be written or prominently displayed on the shipping boxes and all related documents. The defective part should be shipped freight pre-paid to the factory. Upon examination by MAMAC Systems, if the unit is found to be defective, it will be repaired or replaced at no charge to the customer. However, this warranty is void if the unit shows evidence of being tampered with, damaged during installation, misapplied, misused, or used in any other operating condition outside of the unit's published specifications.

MAMAC Systems makes no other warranties or representations of any kind whatsoever, expressed or implied, except that of title. All implied warranties including any warranty of merchantability and fitness for a particular purpose are hereby disclaimed. User is responsible to determine suitability for intended use.

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Every precaution for accuracy has been taken in the preparation of this manual, however, MAMAC Systems neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the product in accordance with the information contained in the manual.



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