

GE Measurement & Sensing Technologies General Eastern Instruments

INDUSTRIAL HUMIDITY MEASUREMENT



Instrumentation for Your Process Applications

The DewPro[®] Industrial Measurement Series

From automotive manufacturing (i.e. painting) to the environmental control equipment used in cleanrooms and laboratories, the production of polymers, textiles, ceramics, food, to metal heat treating, power plants and more, control of moisture levels is critical. Precise control is impossible, however, without accurate measurement and monitoring. The DewPro[®] Industrial Moisture Line of transmitters and probes from General Eastern provides economical, accurate, and versatile solutions for a wide variety of industrial process control requirements.

When Moisture Matters

While moisture can be a contaminant in certain processes, it may also be crucial to some applications, such as the production or drying of artificial fibers, pharmaceuticals, and a host of other materials. With many process variables, the precise measurement of moisture levels is often the most crucial. The DewPro Industrial Series provides accurate, reliable moisture analyzers for dew point temperatures from -15°C to +150°C.



Relative Humidity Sensor Technology

A polymer dielectric sensor provides capacitance technology for gaseous applications with dew point temperatures above -15°C. Interdigitated electrode fingers, a polymer layer, a porous protective metal layer, and a second polymer layer complete the construction of the capacitance sensor element (see illustration above). The capacitance of the polymer sensor is directly related to the relative humidity (RH) of gases. An integrated platinum temperature sensor accounts for the temperature dependence of RH.

Features

Depending on the model selected, DewPro[®] Industrial Series Moisture Analyzers provide:

- Simple two-wire connection 4 to 20 mA loop-powered
- Polymer dielectric sensor system for accurate, reliable measurement
- Integral filtering and flow regulation no sampling system needed
- Easy mounting
- Easy programming in the field



RH-Plus MR 2350 Applications:

- Clean rooms
- Food processing & storage
- ETO sterlizers
- Medical air dryers
- Refrigerant dryers
- Heat treating
- Pharmaceutical/medical storage
- Leak testing





MMR30 Applications:

- Refrigeration drying
- Refrigeration dryer manufacturing



MMR31 Applications:

- Cleanrooms
- Food storage
- HVAC and refrigeration
- Pharmaceutical/Medical storage
- Many other applications





MDR3 Relative Humidity Probe

DewPro® MDR3 Series probe includes a removable filter cap for easy cleaning in dirty applications. The probe incorporates a polymer dielectric capacitance sensor for quick response times and accurate dew point measurements as well as a platinum RTD for temperature measurement. The MDR3 has been approved by SIRA (CENELEC) and FM (Factory Mutual, USA) as EEx ia IIC T4 for use in hazardous areas with intrinsic safety barriers.

Features:

- Proven, polymer capacitive sensor
- Platinum RTD temperature sensor
- Trouble-free indoor or outdoor mounting
- Approved for use in hazardous areas with intrinsic safety barriers



Dimensional Drawing & Ordering Information: See page 14

Ordering Information: See page 8

Probe Specifications

Sensing Element: RH Range:	Silicon-based polymer, capacitance principle, IC electronics 0 to 100%	Signal Transmission:	Moisture and temperature frequencies allowing 1000 ft. (350 meters) of standard four-wire cable (shielded to maintain EMI/RFI/ESD resistance)
RH Accuracy:	±2% in the range of 0% to 90% ±3% in the range of 90% to 100%	Probe Tube:	316 stainless steel; 0.5" diameter; 6.8" long (12.7 mm x 172 mm)
Dew Point Range:	-15°C to + 75°C (5°F to 167°F)	Typical Probe Mounting:	
Dew Point Accuracy:	Better than $\pm 1^{\circ}$ C ($\pm 1.8^{\circ}$ F) if T>30°C (86°F) and RH>40%, T<30°C (86°F) and RH>30%		0.5" tube x 0.5" MNPT compression fitting or ANSI flange
Repeatability:	Better than 0.5% RH	Sensor Guard:	Rugged, removable, easy-to-clean, 100 micron sintered 316 L stainless steel filter; additional hydrophobic filter on the sensor element allowing the penetration of water vapor but not water droplets
Hysteresis:	Less than $\pm 0.9\%$		
Standard Operating Temperature:	-10°C to +85°C (14°F to 185°F)		
Temperature		Weight:	0.5 lbs. (0.23 kg)
Accuracy:	±0.5°C (±0.9°F)	Approval:	CENELEC, FM (EEx ia) IIC T4, 95°C
Maximum Operating Pressure:	250 psig (17 bar)		(203°F) using the Zenar barrier kit IS 20 ST from General Eastern or equivalent
Sensor Electronics:	Integrated circuitry with a platinum RTD temperature sensor		

RH-Plus MR 2350 Relative Humidity Analyzer

The RH-Plus MR 2350 is a moisture analyzer designed to operate with the General Eastern MDR3 Relative Humidity Probe. The unit offers an optional input that can be used for pressure compensation, an external temper-ature probe, or any other sensor this input can be configured to accept 0 to 5 VDC and 4 to 20mA.

The standard product comes with one current output (0-20 mA or 4-20 mA), a system alarm relay, and 3 adjustable relays, all with single-pole double-throw 2.5A contacts, selectable failsafe mode, and adjustable hysteresis. One or two additional current outputs are available.

The Model MR2350 is available in both wall mount or panel mount configurations. When used with the MDR3 Humidity Probe, the system is capable of providing relative humidity readings in the range of 0-100% RH over a temperature range of -15°C to +85°C. When used with approved Zener Barriers the Model MR 2350 is approved as intrinsically safe for use in hazardous areas by Cenelec and FM.

Features:

- Optional pressure or temperature compensation
- One or three current outputs
- Three adjustable relay outputs plus system alarm
- User-configurable for a wide variety of applications
- Two Line LCD

MR 2350 Analyzer Specifications

Electronics: State of the art micro-controller providing utmost flexibility to meet Sensing Element: Silicon-based polymer, capacitance principle, IC electronic application needs RH Range: 0 to 100% Standard Inputs: 2 (moisture and temperature) ±2% in the range of 0 to 90%; 90 to100% ±3% **RH Accuracy:** For pressure transducer providing live pressure compensation or other sensor. Signals: 0/1 to 5V, 0/4 to 20mA loop powered, or 4 to 20 mA. If **Optional Input: DP Range:** 5°F to 185°F (-15°C to +85°C) Better than $\pm 1.8^\circ F~(\pm 1^\circ C)$ if T> 86°F (30°C) and **DP Accuracy:** live measurement is not available, pressure compensation can be achieved RH> 40% or T < 86°F (30°C) and RH > 30% by entering a constant pressure value in matrix location V3HO Repeatability: Better than 0.5% RH Moisture Probe: Interconnects with MDR3xx probe Hysteresis Less than $\pm 0.9\%$ User Interface: Five push-buttons, easy configuration using a matrix Standard Oper. Temp.: 5°F to 185°F (-15°C to +85°C) Alpha-Numeric LCD, displays measured value with units of measure, matrix Display: location and programming instructions, error indication with error code if Temp. Accuracy: ±0.9°F (±0.5°C) malfunction occurs; user selectable scanning feature alternating the display Max. Oper. Pressure: 250 psig every 5 seconds through active channels (3 max) EMI/RDI/ESD Signal Transmission: Moisture and temperature converted to frequencies, Full compliance with EN 61326-1 allowing up to 1000 ft. of standard four-wire cable Protection: (shielded to maintain EMI/RFI/SD resistance) Units of Measure: rh%, dew point °C, °F, g/m3, g/kg, Tw °C, °F (Wet Bulb Temperature, vapor pressure in hPa, mmHg, process pressure calculated dew point °C, °F, rh% calculated from separate temperature value (needs temperature (Moisture) Probe Cable Connector: 17 ft. cable permanently attached, or junction box with screw terminals measurement using the optional input) Sensor Electronics: Integrated circuitry with a platinum RTD Units of Measure: For optional input used with a pressure transducer: bara, barg, psia, psig, temperature sensor hPaa, hPag (Pressure) Probe Tube: 316 stainless steel, 0.5" diameter, 8.9" long Meaurement Ranges: User Programmable Standard Probe 3, each configurable to any input, 0/4 to 20 mA, load resistance ${<}500$ Ohms, Analog Outputs: 0.5" tube x 0.5" MNPT, 0.75" MNPT, G 12, 3/4" Mounting: 0/1 to 5V, source resistance 249 Ohms, user selectable range, user selectable x 16 "O" ring compression fitting or ANSI flange condition in case of error to 110%, -10% or hold at last measured value Sensor Guard: Rugged, removable easy-to-clean, 100 micron **Digital Outputs:** 4 relays (SPDT dry contacts rated at 250V AC, 2.5 A, PAC = 300VA, cos phi sintered 316L stainless steel filter; additional > 0.7, P DC 100W, 100 VDC). 1 relay is system alarm. 3 relays are hydrophobic filter on sensot element allowing configurable to any input failsafe mode: energized/de-energized selectable, penetration of water vapor but not water droplets programmable hysteresis, high/low alarm selectable Weight: 0.5 1lb Serial Output: RS 485, sends measured values continuously Approval: CENELEC, (EEx ia) IIC T4, 203°F (95°C), FM Serial Communication: RS 485, needs GEI communication software for setup or diagnostics Class 1, Div. 1 groups A-D using Zener barrier kit IS 20 ST from General Eastern or equivalent Non-volatile memory Program: Data : EEPROM Cable Entry: Metic cable glads M12, 2XM16, M20 Oper./Storage Temp: -10°C to 50°C (14°F to 122°F) Supply Power: 85 to 275 VAC, optional 18 to 36 VDC Wall mount, IP54, NEMA 12, separate connection compartment, panel mount Enclosures: Weight: 1 kg (2.2 lbs)

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Ordering Information: See page 9

MDR3 Probe Specifications

DewPro® MMR 30

The DewPro® MMR 30 is a compact, mid-range moisture transmitter probe designed specifically for refrigeration dryer manufacturers and users. The MMR 30 measures dew point at line pressure or atmospheric pressure and installs easily on a dryer outlet header.

The MMR 30 uses a proven polymer capacitive sensor to provide a measurement range of -15° C to $+85^{\circ}$ C ($+5^{\circ}$ F to $+185^{\circ}$ F) with $\pm 1.0^{\circ}$ C ($\pm 1.8^{\circ}$ F) accuracy. The instrument can be configured and controlled with a PC using DewPro Communication software. With this software, the user can set the dew point range, adjust the loop content and read the dew point.

Features:

- 4 to 20 mA loop powered
- Simple two-wire connection
- Fast response times
- Trouble-free indoor or outdoor mounting
- Internal bypass system
- Eliminates sample system
- Measures at line pressure

Options:

- DewPro Communication Software
- English or Metric Fittings
- Integral display with user interface
- Power Supply

• Wall Mount Kit

- External display available with
- loop-power supply and alarm contacts

Ordering Information: See page 9

Specifications

Sensing Element:	Silicon-based polymer, capacitance principle, IC electronics		
Dew Point Range:	$-15^{\circ}C$ to $+85^{\circ}C$ ($+5^{\circ}F$ to $+185^{\circ}F$)		
Dew Point Accuracy:	$\pm 1^{\circ}C~(\pm 1.8^{\circ}F)$ for dew points above $0^{\circ}C~(+32^{\circ}F)$		
Repeatability:	±1°C (±1.8°F)		
Standard Operating Temperature:	-15°C to +85°C (+5°F to +185°F)		
Maximum Operating Pressure:	250 psia (17 bar)		
Output:	Loop current 4 to 20 mA; 16 μA resolution		
Flow Block:	316 stainless steel (1.440/1.4436) with 1/2" MNPT (G 1/2 thread (DIN ISO 228)) and gasket seal		

Wrench Width for Flow Block:	1-5/8" (42 mm)
Electronics:	Microprocessor controlled
Moisture Unit:	Dew point temperature in °F or °C, hardware selectable
Supply Power:	24 V DC nominal, tolerance 12 to 32 V DC
Protection:	NEMA 4X
Weight:	4.4 lbs. (2 kg.)







DewPro[®] MMR 31

The MMR 31 Loop Powered Moisture Analyzer represents a simple, cost-effective solution for mid-range moisture measurements. Whether you need to improve product economy, increase product quality, maintain comfort levels, or preserve the properties of stored foods or other supplies, the MMR 31 allows application flexibility. The MMR 31 can also be quickly recalibrated in the field using salt bottles. A second, isolated loop for temperature is optional. (U.S. patent # 5,677,476)

Features:

- Economical, versatile analyzer measures relative humidity, dew point, absolute humidity, mixing ratio
- Proven polymer capacitive sensor for fast response and calibration stability
- 0 to 100% RH or dew point measurement range of -15°C to +85°C
- Simple, two-wire connection (4 to 20 mA)
- Easy mounting with standard compression fittings
- Simple field recalibration with salt bottles
- NEMA 4X (IP67) Enclosure

Options:

- Wall mount kit
- Integral Display with user interface
- English or Metric fittings
- DewPro Communication Software
- Second isolated loop (patented) for temperature
- External display available with loop-power supply and alarm contacts

Specifications

Sensing Element:	Silicon-based polymer, capacitance principle, IC electronics	Maximum Operating Pressure:	250 psia (17 bar)
RH Range:	0 to 100%	Outputs:	Loop current 4 to 20 mA, 16 μ A resolution
RH Accuracy:	$\pm 2\%$ in the range of 0% to 90% $\pm 3\%$ in the range of 90% to 100%		Optional output for temperature
		Electronics:	Microprocessor controlled
Dew Point Range:	$-15^{\circ}C$ to $+85^{\circ}C$ ($+5^{\circ}F$ to $+185^{\circ}F$)	EMI/RFI Protection:	Meets IEC 801-1 through 6
Dew Point Accuracy:	Better than $\pm 1^{\circ}$ C ($\pm 1.8^{\circ}$ F) if T>30°C (86°F) and RH>40%, T<30°C (86°F) and RH>30%	Moisture Units:	% RH, dew point temperature in °F or °C, absolute humidity in g/m ³ , or mixing ratio in g/kg, hardware selectable
Repeatability:	±1°C (±1.8°F)	Power Supply:	24 V DC nominal, 12 to 32 V DC range, or tolerance +8 V DC to -15 V DC
Temperature Range:	-15°C to +85°C (+5°F to +185°F); temp. signal available with second loop	Protection:	NEMA 4X (IP 66)
		Prohe Tube	316 SS 1/2" (12 7mm) diameter
Temperature Accuracy:	0.5°C (±0.9°F)	Trobe Tuber	insertion length 3.0" (75mm) to 5.9"
Absolute Humidity			(190mm), adjustable
Range:	1 to 350 g/m ³	Typical Probe Mounting:	
Mixing Ratio Range:	1 to 830 g/kg		1/2" tube x 1/2" MNP1 or 1/2" tube x G 1/2 compression fitting
		Weight:	4.4 lbs (2 kg)



DewPro[®] MMR 101 High-Temperature Moisture Transmitter

A high-temperature loop-powered moisture and temperature transmitter with two current loops for in-line measurement. Simple two-wire or four-wire connection and rugged, stable housing ensure trouble-free mounting indoors or outdoors.

Features:

- Operating temperature up to 150°C (302°F)
- 0 to 100% relative humidity
- Dew point 0°C to 150°C (32°F to 302°F)
- 4 to 20 mA loop-powered
- Second isolated 4 to 20 mA loop for temperature measurement (patented)
- 1/2" MNPT or other process connections
- Capacitive polymer sensor
- Platinum RTD temperature senor
- Microprocessor electronics in NEMA 4X enclosure (IP 66)
- IS or x-proof FM approved

Options:

- Integral Display with user interface
- English or Metric fittings
- External display available with loop-powered supply and alarm
- DewPro Communication Software contacts

Ordering Information: See page 10

Specifications

Sensing Element:	Polymer; capacitance	Hardware Selectable Units: Standard Temperature Output:	0% to 100% RH, 0°C to 100°C or 32°F to 212°F dew point (up to 320°F or 150°C under system pressure), 0 to 1000 g/m ³ absolute humidity, and 0 to 1000 g/kg mixing ratio dry air
RH Range:	0 to 100%		
RH Accuracy:	±2%		
RH Resolution:	±0.02%		
RH Repeatability:	±1%		
Temperature Senor:	Platinum RTD		$0^{\circ}C$ to $150^{\circ}C$ (32°F to 302°F) range
Process Temperature Range:	0°C to +150°C (+32°F to +302°F)	Display:	4-digit numeric display with bar graph and matrix position indication. Four user interface keys for unit selections, output adjustments and ranging
Temperature Accuracy:	±1.1 °C (±2°F)		
Temperature Resolution:	0.05°C (0.09°F)	Protection:	NEMA 4X (IP 66) or X-proof
Operating Temperature Range:	Electronics, -40°C to +85°C (-40°F to 185°F)	Probe Tube:	316 SS, 0.5" diameter. Adjustable insertion length from 3" (76.33 mm) to 14.25" (362
Maximum Operating Pressure:	150 psi (10.2 bar)	Typical Mounting	mm)
Electronics:	Microprocessor controlled, loop-powered	Adapter: Sensor Guard:	1/2" tube x $1/2$ " MNPT compression fitting;
EMI/RFI Protection:	Meets IEC 801-1 through 801-6		10 micron sintered filter 216 SC cor
Loop Power Supply:	24 V DC nominal, 12 to 32 V DC range		40 micron sintered litter, 310 SS cap
Outputs:	Two fully isolated 4 to 20 mA current loops (moisture and temperature) patented (U.S. patent #5,677,476)	weight:	4.4 IDS (Z Kg)







Ordering Information



Y Other

5 Cable Length

- 1 500 cm (17 feet) standard
- 2 50 cm, Harting connector (K-version) (1.64 feet)
- 3 cm Cable Length (50 to 30000 cm) (Price based on units of 100 cm)
- 4 1' to 1000' (Price based on units of 1 ft.)
- 5 *Without cable
- 9 Other

 \star For "5" option on mounting hardware for "C" option Probe structure



* 1/4" tube fitting used with 1/2" MNPT process connection selection 6 mm tube fitting used with G 1/2 process connection selection

Ordering Information



- 4 Without display, 3.6 mA fault signal
- 9 Other

5 Probe Length

- A 16" (406.4mm)
- **B** 9" (228.6mm)

The Right Solution for Your Application

General Eastern has over a quarter century of experience in the design, development, and production of global humidity sensing technologies, relative humidity sensors, transmitters, generators, and calibration equipment. The company provides standard and custom-designed humidity measurement solutions for countless applications over a wide range of industries. Whether your humidity-sensing needs entail choosing the correct sensing technology, the right sensor, or accurate advice, trust the experts.

The General Eastern Family of Humidity Measurement Products

- Sensors
- Humidity Transmitters
- Industrial Humidity Transmitters
- Process Humidity Transmitters
- Humidity Transfer Standards
- Humidity Generators

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