

## M3 CHILLED MIRROR MONITOR



The Model M3 is General Eastern's top of the line chilled mirror hygrometer. It computes, displays, and outputs any humidity parameter. Since many commonly used humidity parameters are either temperature or pressure dependent, the Model M3 is provided with three sensor inputs - a chilled mirror dew/frost point sensor, a temperature sensor, and a pressure sensor. The Model M3 is a benchtop indicator. It can be mated with any one of five Chilled Mirror sensors to provide an overall measurement range from  $-80^{\circ}$  to  $+85^{\circ}\text{C}$  ( $-112^{\circ}$  to  $185^{\circ}\text{F}$ ) dew/frost point, 0.003 % to 100% RH,  $<500$  PPB<sub>v</sub> to  $>200,000$  PPM<sub>v</sub>, or the equivalent in any other humidity parameter.

The Model M3 utilizes advanced microprocessor control, and allows the user to select analog or digital servo-loop control. It is available with General Eastern's patented PACER™ as standard. PACER™ is designed to reduce contamination induced errors, and provide long, unattended operation in industrial applications. Three independent 4-20mA and 0-5 VDC analog outputs, and RS-232C digital output are provided. The RS-232C port allows the analog outputs to be scaled, and provides direct communications with a host computer.

### Features:

- State of the art humidity, temperature, and pressure monitor which requires no calibration
- Choice of five, interchangeable Chilled Mirror sensors
- Temperature sensor
- Pressure sensor
- Selectable analog or digital (DIGILOOP) control
- On-board microprocessor to calculate and display any relative humidity parameter (Dew/Frost point, % RH, PPMV, PPMW, Vapor Pressure - psia / mbar, Wet Bulb/Dry Bulb, Grams/M<sup>3</sup>, Grams/kg, Grains/Lb, Enthalpy - BTU/lb / kJ/kg, Other user-programmed humidity parameters
- Metric or English units
- NIST traceability
- Three front panel digital displays and mirror control status indicator
- Four-wire PRT temperature measurement
- Three independent 4-20mA and 0-5 VDC analog outputs with programmable scaling
- Three Form C alarm relay
- Digital communications via RS-232C port
- PACER™ circuitry for reduction of contaminant error

**PERFORMANCE:****Accuracy (complete system at 25°C):****Dew/Frost Point:**  $\pm 0.2^{\circ}\text{C}$  ( $\pm 0.36^{\circ}\text{F}$ )**Temperature:**  $\pm 0.15^{\circ}\text{C}$  ( $\pm 0.27^{\circ}\text{F}$ )**Relative Humidity:** +/- 1% of reading\***Pressure:**  $\pm 0.5\%$  of scale**Other parameters:** Please consult factory**Sensitivity:**  $> 0.05^{\circ}\text{C}$  ( $0.09^{\circ}\text{F}$ )**Repeatability:**  $\pm 0.05^{\circ}\text{C}$  ( $\pm 0.09^{\circ}\text{F}$ )**Hysteresis:** None**Measurement Ranges:****Chilled mirror sensors:** 1111H, D-2, SIM-12H, 1311DR, 1311XR**Range:**  $-80^{\circ}$  to  $+85^{\circ}$  ( $-112^{\circ}$  to  $185^{\circ}$ ) dew/frost point, depending on sensor used. 0.003% to 100% RH.**Temperature Sensors:** T-100,  $-80^{\circ}$  to  $+100^{\circ}\text{C}$  ( $-112^{\circ}$  F to  $+212^{\circ}\text{F}$ )**Pressure Sensors:** PT-30A, 0 to 30 psia (0 to 2 bar) - PT-300A, 0 to 300 psia (0 to 21 bar). User-supplied analog signal.**Required Sample Flow:** 0.5 to 5.0 SCFH (0.25 to 2.5 L/min)**Maximum Cooling Rate:****Dew/Frost Point:**  $1.5^{\circ}\text{C}$  ( $2.7^{\circ}\text{F}$ )/sec (typical, above  $0^{\circ}\text{C}$  ( $32^{\circ}\text{F}$ ))**Response Time:****Temperature:**  $< 7$  sec. ( $+25^{\circ}$  to  $+70^{\circ}$  ( $+77^{\circ}$  to  $+158^{\circ}$ ) step change)**Pressure:** 1 sec to 90% of steady state (10% to 90% change)**Display Resolution:** Three displays, 6 digit, 0.1 or 0.01 selectable**Update Time:** 4 seconds max, RS-232C off. 8 seconds max, RS-232C on

\* - nominal from calculation

**PHYSICAL:****Weight:** 11kg. (23 lb.)**Shipping Weight:** 12 kg. (26 lb.)**Environmental:** General purpose bench or rack mount.**FUNCTIONAL:****Outputs:****Analog:** Three 4-20 mADC, 500 ohm max. 0-5 VDC, 5mA max.**Analog Scaling (std.): Dew/Frost Point:****Sensors 1111H, D-2:**  $-40$  to  $+60^{\circ}\text{C}$  ( $-40$  to  $+140^{\circ}\text{F}$ )**SIM-12H:**  $-25$  to  $+100^{\circ}\text{C}$  ( $-13$  to  $+212^{\circ}\text{F}$ )**1311DR, 1311XR:**  $-80$  to  $+20^{\circ}\text{C}$  ( $-112$  to  $+68^{\circ}\text{F}$ )**Temperature:**  $-40^{\circ}$  to  $+60^{\circ}\text{C}$  ( $-40^{\circ}$  to  $+140^{\circ}\text{F}$ )**Pressure:** PT-30A, 0 to 30 psia (0 to 2 bar) - PT-300A, 0 to 300 psia (0 to 21 bar)**Digital:** RS-232C**Alarm:****Relay:** Three Form C, SPDT, 5A**Service Alarm:** TTL compatible. Service bit also available on RS-232C output.**PACER™ status:** TTL compatible. Status bit also available on RS-232C output.**Displays:** 3 displays, 6 digit LED**Power:** 100, 115, 230 VAC (+15%, -20%) switch selectable, 50-60HZ, 75 watts max.**Operating Ranges:****Sensors:****Ambient Temp.:**  $-15^{\circ}$  to  $+95^{\circ}\text{C}$  ( $+5^{\circ}$  to  $+203^{\circ}\text{F}$ ) depending on sensor**Pressure:**  $-14.7$  to 300 psig (0 to 22 bar) depending on sensor**Electronics:****Ambient Temp:**  $0^{\circ}$  to  $+50^{\circ}\text{C}$  ( $+32^{\circ}$  to  $+122^{\circ}\text{F}$ )**Relative Humidity:** 85% max.**ACCESSORIES:****CC-M3,** carrying case**T-100,** temperature sensor**PT-30A,** pressure sensor**PT-300A,** pressure sensor