

M4 CHILLED MIRROR MONITOR



The Model M4 is a general purpose chilled mirror hygrometer, suitable for use in a large number of applications. The basic Model M4 measures dew/frost point only. Two optional packages are available. One provides temperature and RH measurement and the other provides pressure and PPMv measurement. Both option packages include a second analog output as well as an alarm relay. The Model M4 is a benchtop indicator with rack and panel mount adapters available. It can be mated with any one of five Chilled Mirror sensors to provide an overall measurement range from -80° to +85°C (-112° to

185°F) dew/frost point or 0.003 % to 100% RH. The Model M4 utilizes advanced microprocessor control, and is available with General Eastern's patented PACER™ as standard. PACER™ is designed to reduce contamination induced errors, and provide long, unattended operation in near ambient applications. Autobalance is user selectable, 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 dew/frost point monitor which requires no calibration
- Choice of five, interchangeable Chilled Mirror sensors
- Temperature and RH capability (optional)
- Pressure and PPMv capability (optional)
- Displays DP in °C or °F
- Optional RH, ambient temperature display
- Optional pressure and PPMv display
- NIST traceability
- Front panel digital displays and mirror control status indicator
- Four-wire PRT temperature measurement 4-20mA and 0-5
- VDC analog outputs with programmable scaling. A second set of outputs is optional.
- Form C alarm relay (optional - user assignable)
- Digital communications via RS-232C port
- PACER™ circuitry for reduction of contaminant error



SPECIFICATIONS

Performance

Accuracy (complete system 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 (optional): $\pm 1\%$ of reading*
Pressure (optional): $\pm 0.5\%$ of scale
Sensitivity: $> 0.05^{\circ}\text{C}$ (0.09°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° to $+50^{\circ}\text{C}$ (-112° to 122°F) dew/frost point depending on sensor used. 0.003% to 100% RH.
Temperature Sensors (optional): T-100E, -80° to $+100^{\circ}\text{C}$ (-112° to $+212^{\circ}\text{F}$) User supplied analog or 4-wire PRT signal.
Pressure Sensors (optional): PT-30A, 0 to 30 psia (0 to 2 bar) - PT-300A, 0 to 300 psia (0 to 21 bar) - User-supplied 4-20mA 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°C (2.7°F)/sec (typical, above 0°C (32°F))

Response Time

Temperature: < 7 sec. ($+25^{\circ}$ to $+70^{\circ}\text{C}$ ($+77^{\circ}$ to $+158^{\circ}\text{F}$) step change)
Pressure: 1 sec to 90% of steady state (10% to 90% change)
Display Resolution: $0.1^{\circ}\text{C}/^{\circ}\text{F}$ (dew/frost point, temperature), 0.1% (RH)
Update Time: 2 seconds

Physical

Weight: 3.6 kg (8 lb.)
Shipping Weight: 4.5 kg (10lb.)
Environmental: General purpose bench or rack mount.

* - nominal from calculation

Functional

Outputs
Analog: One (2nd opt.): 4-20mA DC, 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 $+68^{\circ}\text{F}$)
RH (optional): 0% to 100% RH
Temperature (optional): -40° to $+60^{\circ}\text{C}$ (-40° to $+140^{\circ}\text{F}$)
Pressure (optional): 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 (optional): Form C, SPDT, 2A
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: 1 display, 3 1/2 digit LED
Power: 100, 115, 230, 240 VAC ($\pm 10\%$), 50-60HZ, 35 watts max.

Operating Ranges

Sensors:
Ambient Temp.: -15° to $+95^{\circ}\text{C}$ ($+5^{\circ}$ to $+203^{\circ}\text{F}$) depending on sensor
Pressure: 0 to 300 psia (0 to 22 bar) depending on sensor

Electronics:
Ambient Temp: 0° to $+50^{\circ}\text{C}$ ($+32^{\circ}$ to $+122^{\circ}\text{F}$)
Relative Humidity: 85% max

Accessories

PB-M4: panel mounting adapter
PM-M4, 19" rack mount adapter
T-100E: temperature sensor
PT-30A/PT-300A: pressure transducer.