

# VIASPACE

## ENERGY



# VIASENSOR HS-1000

The VIASPACE real-time humidity sensor, VIASENSOR, uses patent pending miniature laser technology to enable real-time, accurate, and reliable measurement of the humidity of the inlet gases in PEM fuel testing and operation. The VIASENSOR provides researchers and fuel-cell developers with a solution for in-situ, real-time humidity measurements.

#### Heated sample cell

- Heats to 80°C in less than 20 minutes  
Note: Incidental condensation dries quickly; Device does not require cleaning or disassembly, and contaminants do not impact measurement accuracy

#### Continuous readings with rapid response time

- Response time as fast as 1.6 sec for gas flows greater than 0.4 L/min
- Transient changes in humidity are measured and displayed in real-time

#### Measures molecular absorption of water vapor

- No interference from entrained liquid droplets
- No gas composition or pressure dependence
- No interference from typical fuel cell gas stream background components
- Measurement accuracy and reliability are not dependent on flow rate

#### Small sensor head: Easy and convenient for in-situ installation

#### Non-contact optical measurement

- Flow-through design for easy installation
- Contaminants in gas will not damage sensor or cause drift in readings
- No drift in calibration, even after accidental condensation in sample cell  
Calibration remains stable for one year (minimum)
- Sensor cannot contaminate gas stream

#### Continuous analog output

- Dew point (°C) or Water partial pressure (mB) (user selectable)
- 0-5VDC, 20mA maximum

#### Data logging Software: Real-time plotting of dew point

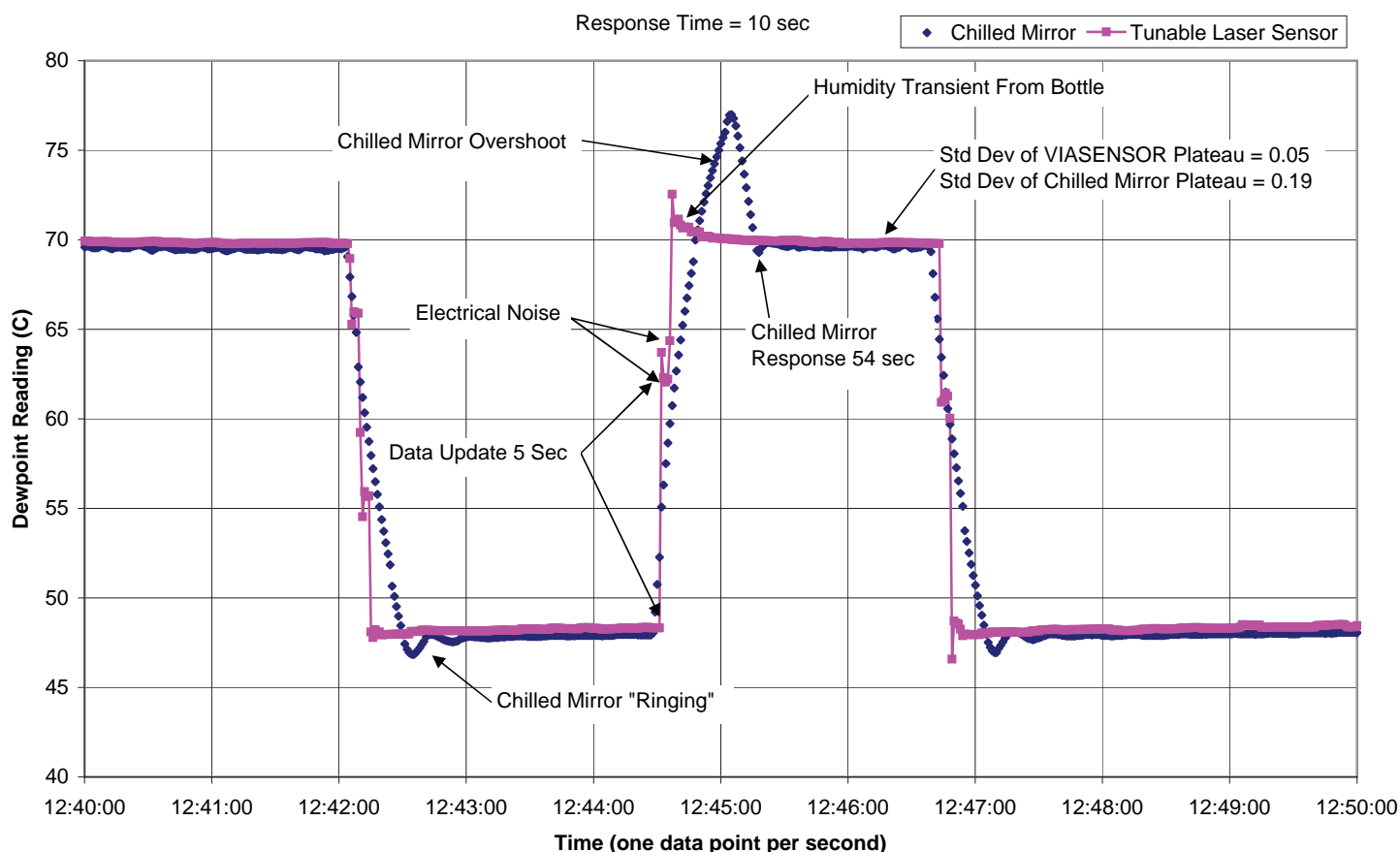
### Specific Benefits for:

- Fuel cell gas measurements
  - Quickly verify the accuracy and stability of humidification equipment
  - Measure gas humidity in and out of fuel cell to verify mass balance
  - Allow user to experiment confidently with a range of typical fuel cell conditions such as humidity, temperature and flow rates
- Products of Combustion measurements
  - Accurately measure water vapor in Products of Combustion (POC)
  - No drift caused by contaminants in the gas stream
  - Negligible interference from typical Products of Combustion (POC)

## System Specifications:

- Measurement Range: 40 mB to 1000 mB water vapor partial pressure (30°C to 100°C dew point)
- Response time: As quickly as 1.6 seconds for gas flows greater than 0.4 L/min
- Max pressure: 30 psig (200 kPa gauge)
- Flow rate range: flow rate independent
  - note: response time increases below 0.4 L/min
  - High flow rates (above 5 L/min) may be accommodated using a slipstream/bypass flow line.
- Ambient temperature range: 10°C to 30°C
- Max sample cell temperature: 105°C
- Wetted materials: Nickel plated aluminum, sapphire, epoxy
- AC power: 90 to 240 VAC, 1 A, 50 to 60 Hz
- Dimensions and weight:
  - Sample cell: 6" x 6" x 2" (15 cm x 15 cm x 5 cm), 1.7 lb (0.8 kg)
  - Electronics: 8.75" x 10" x 3.5" (22.2 cm x 25.4 cm x 8.9 cm), 3.75 lb (1.7 kg)
- Cable length: 40" (1 m)
- Analog output (0-5VDC), 20 mA maximum
- Data logging software requirements (for computer):
  - Minimum display resolution: 1024 x 768
  - Serial input or Serial/USB adapter

### VIASENSOR Transient Response @ Average=8, Logger=2



VIASPACE Inc. delivers leading edge technology solutions to the global markets for fuel cell energy supply, fuel cell testing, homeland security, commercial security, national defense, industrial process control, microelectronics, sensor fusion, diagnostics/prognostics and information technology.

VIASPACE Energy provides products for fuel cell testing and fuel cell energy supply and develops new clean energy products and applications.

Subsidiary Direct Methanol Fuel Cell Corporation is engaged in developing, manufacturing, distributing and obtaining safety certification for disposable methanol fuel cartridges to provide the energy source for fuel cell-powered products.



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