

# HygroSmart HS3 Probe

## Advanced Interchangeable Relative Humidity and Temperature Probe

The HygroSmart HS3 is an accurate, stable and user configurable probe designed to provide reliable humidity measurement for process control in a wide range of applications. The HS3 probe features interchangeable sensor technology ensuring minimal process downtime and a low cost of ownership.



### Highlights

- Accuracy  $\pm 0.8\%$  RH
- Calculated hygrometric outputs
- Probe 100% end-user configurable
- User configurable voltage outputs
- Modbus RTU over RS485 digital comms
- Interchangeable sensor for rapid maintenance
- Digital zero & span trimming
- Rugged 10 bar pressure rated industrial housing
- Traceable 5 point calibration certificate
- Operating temperature  $-40$  up to  $120^{\circ}\text{C}$  ( $-40$  to  $248^{\circ}\text{F}$ )
- Loop checking Simulator

### Applications

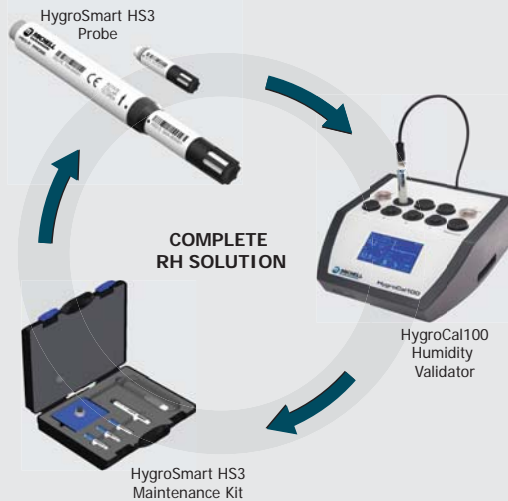
- Environmental measurement/control of industrial processes such as:
  - Food production and packaging
  - Pharmaceutical manufacturing
  - Engine testing
  - Incubators and hatcheries
  - HVAC
- Humidity measurements for meteorology
- OEM component for general RH measurement/control products

# HygroSmart HS3 Probe

## The Complete RH Solution

The HygroSmart HS3 Probe is designed to meet three basic needs for RH and Temperature measurement/control:

- Ensure the process keeps running
- Maintain process accuracy
- Minimise downtime and keep a low lifetime cost



Michell's designers recognised customers' needs to have a complete practical system for RH measurement, maintenance and field validation. The HS3 Probe, HS3 Maintenance Kit and HygroCal100 Humidity Validator provide this solution from one certified supplier.

## Handling Customers' Flexibility

The HS3 Probe has been developed to be 100% customer configurable. One stock unit can be set up by a customer into an application specific configuration to cover any RH demands on site. This flexibility saves time and money.

- Adjustable zero/span ranging of the RH, Temperature and Calculated Hygrometric Outputs
- Selectable 0 to 1, 2.5, 5, 10 V output signals
- 2 selectable output voltage measured (RH & T) parameters or a choice of 5 calculated parameters (e.g. dew point)
- Addressable Modbus RTU over an RS485 output for up to 32 probes on a multidrop loop
- Probe digital zero/span calibration trimming

The HS3 Probe can be configured at the factory at time of ordering for customers who want a simple fixed configuration solution.

## Validating Probe Accuracy

The portable HygroCal100 Humidity Validator (available separately) enables users to quickly and easily verify the function and accuracy of the HS3 probes. The PC based HS3 Application Software then provides the probe trim adjustment, as required.

## Maintaining Accuracy of Measurement

The HygroSmart HS3 Interchangeable Sensor, within the probe, comprises the RH & temperature element, low power electronics and calibration data.

The sensor uses the latest Michell advanced H8000 capacitive polymer element, developed as a result of over 40 years' experience in challenging moisture measurements, to provide accurate data in a wide variety of applications.

## Zero Process Downtime

Zero downtime is achieved on the HS3 Probe through 2 key features, in conjunction with the use of Michell's HygroCal100 Humidity Validator:

- Minor calibration adjustments can be made on the installed HS3 Probe with a 5-point digital trim adjustment, using the RS485 interface with the HS3 Application Software
- Alternatively, the interchangeable HS3 sensor technology at the front of the probe can be replaced while the probe remains installed

These features ensure there is no disruption to the control process and that system accuracy is maintained.

## A Probe for Demanding Conditions

RH probes are often exposed to heavy shocks and continuous vibration, exposure to water and high levels of electrical noise.

Resistance to these conditions is factored into the design of the HS3 Probe and Sensor:

- Solid corrosion resistant probe body
- 10 bar pressure rating
- Heavy Industrial rfi/emc electrical noise approvals
- IP67 ingress protection rating

## Loop Checking Simulator

The HS3 Probe can be supplied with an optional Simulator Kit which provides a method of loop checking wiring and data acquisition systems during commissioning and maintenance operations.



- HS3-S simulators are programmed to output an accurate and stable RH & temperature signal, when attached to the probe
- These simulators can be reprogrammed, using the HS3 Application Software, to any required output

This simple yet effective option speeds up commissioning and maintenance work, allowing the process to be back online quickly.

## Tracking & Traceability

The HygroSmart HS3 has the following features to simplify tracking the probes for the customer's asset management and quality control systems:

- Indelible alphanumeric serialisation/bar coding of unique serial numbers for the HS3 Probe and replaceable HS3 sensors
- 5-point calibration certificate traceable to national standards with reprint service for misplaced certificates

## Local Data Logging & Indication

The PC based HS3 Application Software provides a wealth of diagnostic tools to allow maintenance engineers to investigate any specific event via the RS485 interface, with the probe installed in the application, including the following features:

- Graphical display of all measured and calculated outputs
- PC logging of measured and calculated data to a CSV file

## Installation Accessories

The HS3 Probe is supplied with optional mounting accessories for wall mount or pressurised environment applications:



15mm (0.6") Probe Mounting Clamp



15mm (0.6") Probe Metal Gland

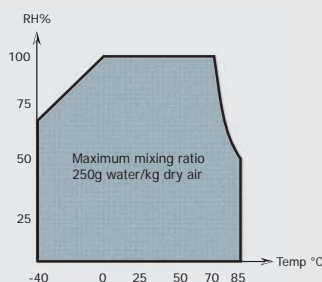
## Reliability of Supply

The probes and sensors are manufactured within Michell's high volume manufacturing facility, which ensures a reliable on-time delivery.

- The Michell global service centres ensure that support in the field is always available
- Michell's purpose built calibration systems provide calibration data traceable to national standards

## Measurement Operating Envelope

The HygroSmart HS3 Probes operate to the defined technical specifications within the following operating condition envelope:



## Technical Specifications

### Performance Specifications

|                               |   |
|-------------------------------|---|
| RH measurement range          | 0 to 100% RH  |
| RH accuracy @ 23°C (73°F)     | ± 0.8% RH (5 to 95%RH)  |
| RH thermal coefficient        | <0.03% RH/°C typical  |
| RH measurement response time  | < 1 sec to RH event   |
| RH element                    | Michell H8000   |
| RH long term stability        | ±1% RH per year   |
| Temperature measurement range | -40 to +85°C (-40 to 185°F)   |
| Temperature accuracy          | ±0.2°C (±0.36F)   |
| Temperature resolution        | ±0.01°C   |
| Temperature technology        | PT1000 1/3 DIN Class B  |
| Recommended storage range     | +10 to +40°C  |
| Calibration                   | Traceable 5-point calibration certificate   |
| Application Software          | HS3 Application Software downloadable from <a href="http://www.michell.com">www.michell.com</a> |

### Electrical Specifications

|  |  |
|--|--|
| Voltage output signals                 | 0-1 V, 0-2.5 V, 0-5 V, 0-10 V  |
| Digital output signal                  | Modbus RTU over RS485 2-wire   |
| Electrical thermal coefficient         | 0.004%/°C  |
| Load resistance                        | 0-1, 0-2.5 V : 10K Ω<br>V : 50K Ω<br>0-5, 0-10 V :   |
| Supply voltage range                   | 5 to 28 V DC   |
| Supply current consumption             | 5 V : 4 mA<br>28 V : 7 mA  |
| Supply protection                      | Protected against reverse voltage and overvoltage  |
| Configurable calculated scales/ranges  | Dew point -40 to +100°C (-40 to 212°F),<br>Water activity 0 to 1,<br>Absolute humidity 0 to 200 g/m <sup>3</sup> ,<br>Specific enthalpy 0 to 800 KJ/kg,<br>Frost point -50 to +10°C (-58 to +50°F) |
| Configurable temperature scales/ranges | °C, °F : -20 to 80°C (-4 to 179°F), 0 to 50°C (32 to 122°F), -40 to +60°C (-40 to +140°F), -30 to +70°C (-22 to 158°F), 0 to 100°C (32 to 212°F)   |
| CE conformity                          | 2004/108/EC heavy industrial immunity  |

### Operating Specifications

|                             |   |
|-----------------------------|---|
| Probe operating temperature | <b>Probe:</b> -40 to +85°C (-40 to 185°F)<br>-40 to +120°C (-40 to 248°F)<br>+10 to +40°C (10 to 104°F) |
|-----------------------------|---|

### Mechanical Specifications

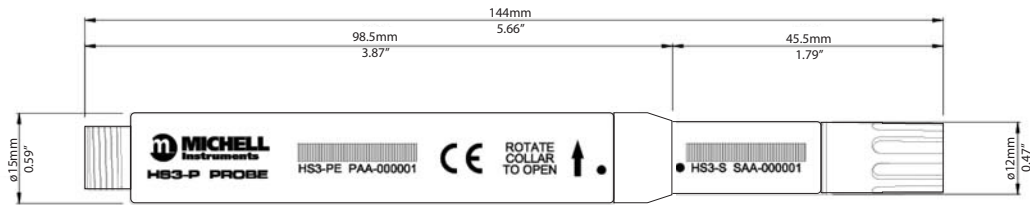
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|------------------------|---|
| Ingress protection     | IP67  |
| Material               | <b>Probe &amp; sensor body:</b> Solid glass filled PBT<br><br>Anodised aluminium<br>Moulded polymer, PVDF |
| Dimensions             | <b>Probe:</b> L=145mm (5.7"), ø15mm (ø0.6")<br>L= 56mm (2.2"), ø12mm (ø0.5")                              |
| Weight                 | 31g (0.07lb) approx (packed weight 45g/0.01lb)  |
| Electrical connections | M12 5 pin (A coded)   |
| Product marking        | Indelible laser etched alphanumeric/bar coded identification  |

### Maintenance Kits (Optional)

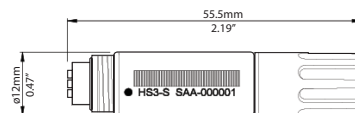
|                                      |  |
|--------------------------------------|--|
| HS3 Probe simulator kit              | Desk-mounted configuration kit, 3 x sensor simulators (25%, 50%, 75%RH at 23°C), spare probe electronics, carry case |
| HS3 Probe configuration kit          | Desk-mounted configuration kit, spare probe electronics, carry case  |
| HS3 Probe logger/configuration cable | 1.8 metre USB to RS485 converter cable with M12 connector  |

Product Dimensions

HygroSmart HS3 Probe - HS3-P



HygroSmart HS3 Probe Replacement Sensor - HS3-S-R



Maintenance Kits

- HS3-SCK HS3 Probe Simulator Kit (includes HS3 Probe Configuration Kit)
- HS3-CK HS3 Probe Configuration Kit
- HS3-CKL HS3 Probe Logger/Configuration Cable 1.8m



The orange HygroSmart symbol is used to identify any Michell RH product which has the latest generation HS3 interchangeable sensor.



The blue HygroSmart symbol identifies products using the I7000XP generation interchangeable sensor

Related Products

Below are some of examples of other HygroSmart, RH and Calibration products from Michell Instruments:



**HS3 OEM Sensor**  
Advanced 12mm RH and Temperature Sensor



**PCMini 52**  
12mm RH and Temperature Mini Probe



**WM281/291**  
Advanced Wall Mount RH and Temperature Transmitter



**WR283/293**  
Advanced Remote Probe RH and Temperature Transmitter



**DT284/294**  
Advanced 12mm Duct Mount RH and Temperature Transmitter



**HygroCal100**  
Humidity Validator



**S8000 Remote**  
High Precision Hygrometer



**OptiCal**  
Advanced Humidity Calibrator

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Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.  
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