

# HygroVue<sup>TM</sup>10

Digital Temperature and Relative Humidity  
Sensor with M12 Connector

## Rugged, Reliable, and Flexible

Simple to use and easy to maintain



## Overview

The HygroVue<sup>TM</sup>10 offers a combined temperature and relative humidity element in an advanced digital sensor that is ideal for weather networks. The electronics within the sensor provide accurate measurements, and the sensor is easy to use. The digital SDI-12 output allows a simple connection and measurement by many data logging systems. Another benefit is that this digital output avoids the extra errors associated with measuring analog sensors.

A hydrophobic sintered filter prevents dirt and water from entering the cap. The filter is designed to be resistant to wind-driven rain. A secondary PTFE membrane filter is bonded to the surface of the sensor element to prevent finer dust and mold from directly influencing the measurements.

Because the sensor housing is designed to withstand permanent exposure to various weather conditions and to fit inside a range of radiation shields (including compact shields), the HygroVue 10 is truly suitable for a wide range of monitoring applications.

The HygroVue 10 uses a latest-generation, Swiss-made, combined relative humidity and temperature element based on CMOSens<sup>®</sup> technology that offers good measurements, accuracy, and stability. Each element of the HygroVue 10 is individually calibrated with the calibration corrections stored on the chip. You can easily change the sensor element in the field, which reduces your downtime and calibration costs.

## Benefits and Features

- Uses a combined, pre-calibrated digital humidity and temperature element
- Field-changeable element for fast, on-site recalibration
- Digital SDI-12 output, allowing long cables with no added errors
- Simple data logger programming
- Low power consumption
- Wide operating voltage
- Rugged design with potted electronics
- Standard M12 connector with IP67 sealing rating



## Detailed Description

### Mounting

When you use the HygroVue 10 outdoors, it is standard practice to install the sensor within a housing, known as a shield. The shield prevents solar radiation from heating the sensor and creating measurement errors. The radiation shield also provides a degree of protection from adverse weather, such as hail or driving rain. The most common type of shield is a relatively small, naturally ventilated screen that is low maintenance and requires no power.

The HygroVue 10 is specifically designed for field use with dimensions to suit common radiation shields. (Campbell Scientific recommends the [RAD10E 10-Plate Solar Radiation Shield](#).) You can mount the RAD10E on vertical or horizontal poles.

### Field Calibration

Calibration is easy to carry out by simply changing the sensor element. As each sensor element is individually calibrated, no further sensor adjustments are required. This means that when you change the element, it returns the sensor to the factory calibration state for both temperature and humidity—without interrupting your measurement collection for long periods.

## Specifications

<b>Sensor Element</b>	SHT35 modified by Campbell Scientific
<b>Communications Standard</b>	SDI-12 V1.4 (responds to a subset of commands)
<b>Supply Voltage</b>	7 to 28 Vdc
<b>EMC Compliance</b>	Tested and conforms to IEC 61326:2013
<b>Standard Operating Temperature Range</b>	-40° to +70°C
<b>Main Housing Material</b>	UV stable, white PET-P
<b>Electronics Sealing Classification</b>	IP67
<b>Sensor Protection</b>	Outer glass-filled polypropylene cap fitted with a stainless-steel mesh dust filter with nominal pore size of < 30 µm. The sensor element has a PTFE protective film with a filtration efficiency of > 99.99% for particles of 200 nm or larger size.
<b>Sensor Connector</b>	M12, pin (male), 4-pole, A-coded

<b>Cable</b>	Polyurethane sheathed, screened cable, nominal diameter 4.8 mm (0.19 in.)
<b>Field-Replaceable Chip or Recalibrate</b>	Field-replaceable chip
<b>Sensor Cap Diameter</b>	12.5 mm (0.5 in.)
<b>Body Diameter at Connector</b>	18 mm (0.7 in.)
<b>Length</b>	180 mm (7.1 in.) without cable fitted
<b>Sensor Body Weight</b>	50 g (1.8 oz)
<b>Weight</b>	250 g (8.8 oz) with 5 m (16.4 ft) cable

### Relative Humidity

<b>Measurement Range</b>	0 to 100% RH
<b>Accuracy</b>	<ul style="list-style-type: none"><li>■ -NOTE- The accuracy figures quoted are the 95% confidence limits relative to factory standards.</li><li>■ ±1.5% (at 25°C, over the range 0 to 80% RH)</li><li>■ ±2% (at 25°C, over the range 80 to 100% RH)</li></ul>



## Relative Humidity (continued)

Short-Term Hysteresis	< $\pm 1\%$ RH
Additional Errors at Other Temperatures	< $\pm 1\%$ RH (over $-40^{\circ}$ to $+60^{\circ}\text{C}$ )
Long-Term Stability	$\pm 0.5\%$ per year (maximum drift in clean air conditions)
Reported Resolution	0.001% RH
Repeatability	0.05% RH ( $3\sigma$ noise level)
Response Time with Filter	< 20 s (63% response time in still air)

## Air Temperature

Measurement Range	$-40^{\circ}$ to $+70^{\circ}\text{C}$
Accuracy	<ul style="list-style-type: none"><li>■ -NOTE- The accuracy figures quoted are the 95% confidence limits relative to factory standards.</li><li>■ <math>\pm 0.2^{\circ}\text{C}</math> (over the range <math>-40^{\circ}</math> to <math>+70^{\circ}\text{C}</math>)</li><li>■ <math>\pm 0.1^{\circ}\text{C}</math> (over the range <math>20^{\circ}</math> to <math>60^{\circ}\text{C}</math>)</li></ul>
Long-Term Drift	< $0.03^{\circ}\text{C}$ per year
Reported Resolution	0.001 $^{\circ}\text{C}$
Repeatability	0.04 $^{\circ}\text{C}$ ( $3\sigma$ noise level)
Response Time with Filter	< 130 s (63% response time in air moving at 1 m/s)
Calibration Traceability	NIST and NPL standards

## Maximum Current Drain

Quiescent	50 $\mu\text{A}$
During Measurement	0.6 mA (takes 0.5 s)

