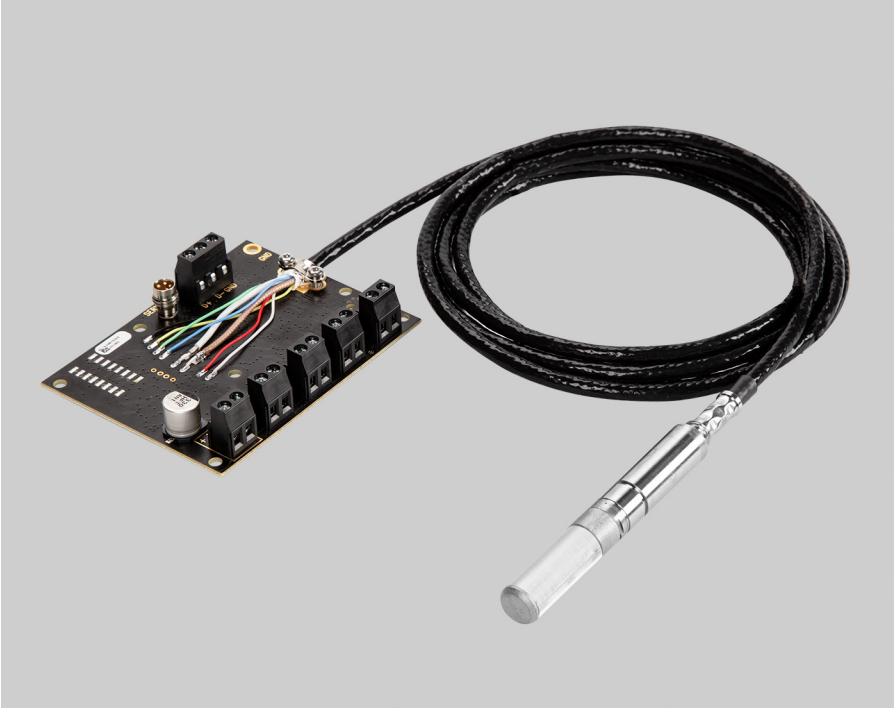
# HMM170 Humidity and Temperature Module

For environmental chambers



## Features

- Warmed sensor and probe for condensation prevention
- Chemical purge for maintaining sensor performance
- Suitable for use in high humidity environments, vacuum, and pressurized chambers
- Temperature measurement range −70 ... +180 °C (−94 ... +356 °F)
- Sensor options for corrosion tolerance, $H_2O_2$ tolerance, and moisture-in-oil measurement
- 3 analog output channels
- Modbus RTU over RS-485
- Several output parameters available
- 3 probe cable length options
- Compatible with Insight PC software

Vaisala HUMICAP® Humidity and Temperature Module HMM170 is an open frame OEM module for integration into demanding environmental chambers and harsh conditions. The module provides a digital RS-485/Modbus RTU output and three freely configurable analog output channels. The module provides relative humidity, temperature, dew point, and other calculated parameters.

## Designed for harsh environments

HMM170 probe covers the full temperature range −70 ... +180 °C (−94 ... +356 °F) used in climate chambers and the whole humidity range up to condensation. The small probe and compact component board offer easy and flexible installation. The probe cable options (2, 5, or 10 m (6.5, 16.4, or 32.8 ft)) offer excellent cost optimization and flexibility to any OEM application. By ordering HMM170 with the appropriate sensor, you can use the module in environments that are frequently sterilized with vaporized hydrogen peroxide ($H_2O_2$) or to measure humidity in oil medium, for example, for transformer and engine monitoring applications.

## Robust sensor technology

The latest general purpose HUMICAP® R2 sensor has improved corrosion resistance. The sensor can tolerate typical chemicals, such as cleaning agents used in climate chambers. The automatic sensor chemical purge function keeps the sensor clean from typical chemical fumes and the additional probe warming function prevents condensation. In case HMM170 gets in contact with water, the automatic heating rapidly dries the sensor to enable fast and accurate humidity measurement.

## Convenient to use

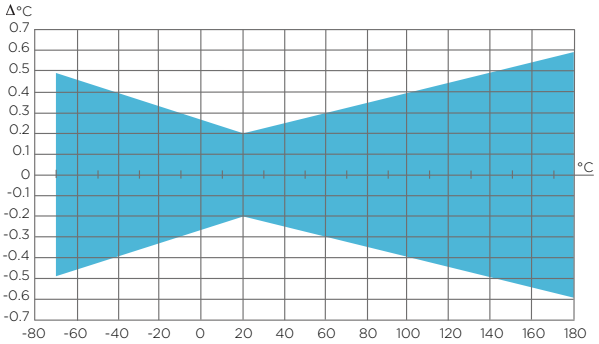
HMM170 is easy to install and convenient to use. It provides both digital and analog outputs for multiple needs. An integrated service port enables a quick and simple way to configure, check, and calibrate the module with the help of a USB cable and Vaisala Insight PC software. In addition, the footprint of the HMM170 component board enables easy update for Vaisala HMM100 users.

# Technical data

## Measurement performance

| | |
|---|---|
| **Relative humidity** | |
| Measurement range | 0 ... 100 %RH |
| Accuracy [1) 2)] | |
| at +15 ... +25 °C (59 ... +77 °F) | ±1 %RH (0 ... 90 %RH)<br>±1.7 %RH (90 ... 100 %RH) |
| at −20 ... +40 °C (−4 ... +104 °F) | ± (1.0 + 0.008 × reading) %RH |
| at −40 ... +180 °C (−40 ... +356 °F) | ± (1.5 + 0.015 × reading) %RH |
| Factory calibration uncertainty at +20 °C (+68 °F) [3)] | ±0.6 %RH (0 ... 40 %RH)<br>±1.0 %RH (40 ... 90 %RH)<br>±1.1 %RH (90 ... 95 %RH) |
| Humidity sensor types | HUMICAP® R2C<br>HUMICAP® 180L2<br>HUMICAP® 180VC |
| $T_{90}$ response time [4)] | 50 s with steel mesh filter<br>60 s with sintered filter |
| **Temperature** | |
| Measurement range | −70 ... +180 °C (−94 ... +356 °F) |
| Temperature sensor | Pt100 RTD Class F0.1 IEC 60751 |
| Typical accuracy at +20 °C (+68 °F) | ±0.2 °C (± 0.36 °F) |

*1) Including non-linearity, hysteresis and repeatability.*
*2) With HUMICAP® 180VC sensor, accuracy is not specified below −20 °C (−4 °F) operating temperature.*
*3) Defined as ±2 standard deviation limits. Small variations possible; see also calibration certificate.*
*4) At +20 °C (+68 °F) in 0.1 m/s air flow with Vaisala HUMICAP® R2C sensor.*




Temperature measurement accuracy over temperature range

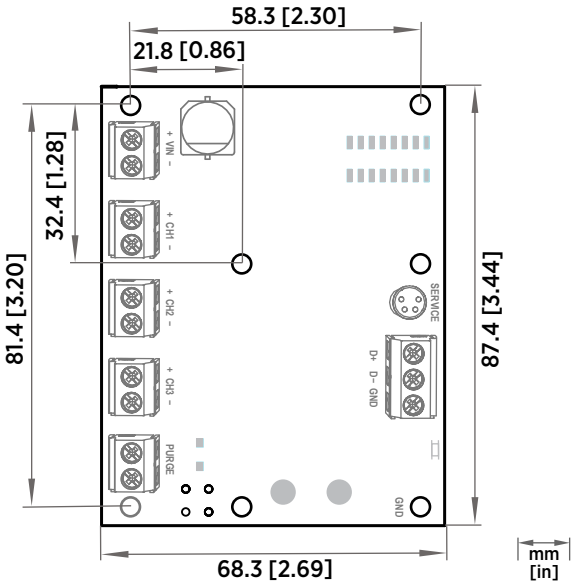
## Operating environment

| | |
|---|---|
| Operating temperature for component board | −40 ... +60 °C (−40 ... +140 °F) |
| Operating humidity for component board | 0 ... 100 %RH, non-condensing |
| Storage temperature | −55 ... +80 °C (−67 ... +176 °F) |
| Operating pressure | 0 ... 10 bar |

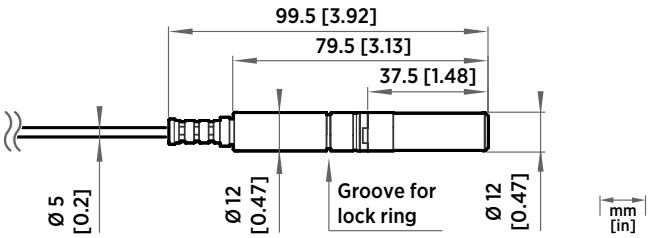
## Accessories

| | |
|---|---|
| USB cable for PC connection [1)] | 219690 |
| Cable gland M20×1.5 for probe cable | HMP247CG |
| Swagelok NPT 1/2" adapter for probe | SWG12NPT12 |
| Swagelok ISO 1/2" adapter for probe | SWG12ISO12 |
| Duct installation kit for probe | 210697 |

*1) Vaisala Insight software for Windows available at www.vaisala.com/insight*




HMM170 component board dimensions




HMM170 probe head dimensions

## Inputs and outputs

| | |
|---|---|
| Three analog outputs (selectable and scalable) | 0 ... 20 mA, 4 ... 20 mA<br>0 ... 1 V, 0 ... 5 V, 1 ... 5 V, or 0 ... 10 V |
| Typical accuracy of analog output at +20 °C (+68 °F) | ±0.05 % full scale |
| Typical temperature dependence of analog output | 0.005 %/°C (0.003 %/°F) full scale |
| External load | $R_L$ < 500 Ω |
| Digital output | RS-485 serial, Modbus |
| Service port | M8 connector for USB cable |
| Start-up time | 3 s at power-up |
| Wire size | 0.5 ... 1.5 mm² (20 ... 16 AWG) |
| **Supply voltage** | |
| when condensation prevention and chemical purge features are not used | 12 ... 35 VDC |
| all features available | 18 ... 35 VDC or 24 VAC ±10 % |
| **Power consumption** | |
| Analog outputs | 12 mA (voltage), 50 mA (current) |
| Chemical purge at 24 VDC | +220 mA |
| Warmed probe at 24 VDC | +240 mA |

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