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HMP240 Series Dewpoint Transmitters for High Humidity Measurements

The HMP243 (on the left) and HMP247 Transmitters with the optional temperature sensor.

Features/Benefits

- Wide temperature range from -40 to +180 °C
- Designed for use in high humidity
- Incorporates the HUMICAP® Sensor for excellent accuracy and long-term stability, neglible hysteresis and resistance to dust and most chemicals
- Optional temperature sensor
- Probe cable lengths: 2, 5 or 10 meters
- Choise of local display, filter, serial bus (RS232C, RS485/422, digital current loop), analog output signal and temperature ranges
- NIST traceable (certificate included)

Note: The temperature probe should be located at least 1 meter from the heated probe.

The HMP240 Series provides fast and reliable dewpoint measurement especially under high humidity conditions where dew would normally form on the humidity sensor head and thereby cause errors in measurements.

Warmed probe head

The temperature of the probe head is constantly kept higher than the ambient temperature thus eliminating the possibility of dew formation on the sensor. The result is uninterrupted, accurate and stable dewpoint measurement. The measurement is fully temperature independent so the warming does not affect the measurement. This patented techology has proven its functionality in a wide variety of applications.

The measurement with the HMP240 Series Tranmitters is fast because the response time of dewpoint is proportional only to the diffusion time of water molecules inside the sensor head.

Two models

The HMP240 Series includes two models: HMP243 and HMP247. Both work from lower humidities up to saturating conditions, and from stable to rapidly changing environments. The HMP243 Transmitter with plastic probe is the most suitable for outdoor measurements, and the HMP247 with pressure tight steel probe more for industrial applications.

Optional temperature sensor

The basic version of HMP240 Series Transmitters has one sensor head; the output variables are dewpoint temperature and mixing ratio. Optionally the transmitter can be equipped with an additional temperature sensor head that measures the ambient temperature, which is used in the calculation of relative humidity, absolute humidity, wet bulb temperature and dewpoint difference to ambient temperature.

Fast, reliable and easy to use

Due to the modular construction, HMP240 series transmitters can be adapted for various applications. The transmitters have two analog output channels and any two of the available variables can be selected as output signals. Transmitters are configured to selected requirements already in the production line.

Typically the user will not need to change any transmitter settings when installing the instrument. If necessary, the transmitter settings can be easily altered in the field. Selecting, scaling and calibrating the analog output signals and parameters can be carried out in a few minutes using software commands.

HUMICAP® performance

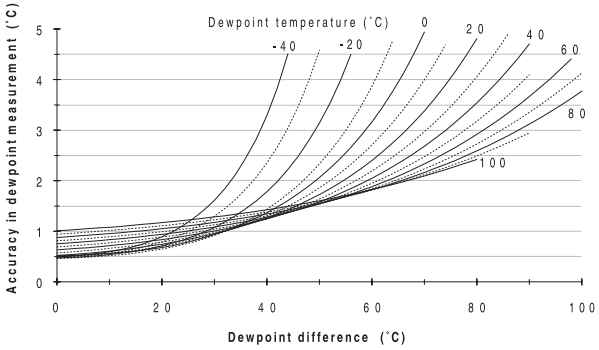
The HMP240 Series Transmitters are fitted with the latest version of the HUMICAP®, a polymer sensor known for its accuracy, reliability and long-term stability. The sensor has a high tolerance to particulate abrasion and chemical contamination.

Technical Data

Dewpoint temperature

Measurement range	-40...+100 °C

Accuracy: find the intersection of the dewpoint temperature curve and the dewpoint difference reading (process temperature - dewpoint temperature) on the x-axis and read the accuracy in dewpoint measurement at the y-axis



Response time (90%) at +20 °C in still air (with sintered filter)	15 s
Sensor	HUMICAP® KC sensor

Temperature (option)

Measurement range	-40...+180 °C
Typical accuracy at +20 °C	±0.1 °C
Typical temperature dependence of electronics	0.005 °C/°C
Sensor	Pt 100 IEC 751, class 1/4 B

Outputs

Two analog outputs, selectable and scaleable	0...20 mA, 4...20 mA, 0...1 V, 0...5 V, 0...10 V
Typical accuracy of analog output at +20 °C	±0.05 % full scale
Typical temperature dependence of analog output	0.005 % full scale/°C
Serial output available	RS 232C

Calculated variables

Available only when temperature sensor head in use

Typical ranges	
relative humidity	0...100 %RH
dewpoint difference	0...+50 °C
mixing ratio	0...500 g/kg d.a.
absolute humidity	0...600 g/m³
wet bulb temperature	0...+100 °C
Accuracy of relative humidity measurement	±(0.5 %RH + 2.5% of reading)

General

Connections	screw terminals for 0.5 mm² wires (AWG 20), stranded wires recommended
Operating voltage	24 VDC/VAC (20...28 V)
Power consumption	200 mA max. (24 VDC)
during re-gaining	270 mA max. (24 VDC)
Recommended external load for	
current outputs	< 500 ohm
0...1 V output	> 2 kohm (to ground)
0...5 & 0...10 V outputs	> 10 kohm (to ground)
Operating temperature range for electronics	-40...+60 °C
with display cover	0...+50 °C
Storage temperature range	-40...+70 °C
Housing material	G-AlSi12 (DIN 1725)
Housing classification	IP 65 (NEMA 4)
Bushing	for 7...10 mm diameter cables (8 x 0.5 mm2 shielded cable)
Probe cable lengths	2, 5 or 10 metres
Humidity sensor protection (Ø 13.5 mm)	sintered filter of stainless steel PPS grid with steel netting

Complies with EMC standard EN61329-1:1997 + Am1:1998; Industrial Environment.

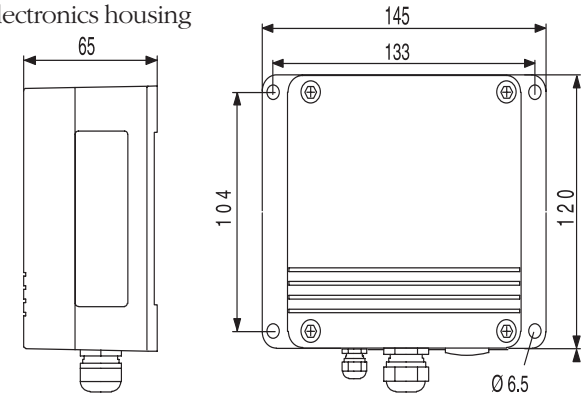
Serial interface modules

Module types	RS 485/422 digital current loop
Assembly	plug-in module
Connections	screw terminals for 0.5 mm2 wires (AWG 20), stranded wires recommended
Number of devices on line	
RS 485/422	32
digital current loop	6 (single loop) 9 (dual loop)
Network cable type	twisted pair
Network line length	1000 m max.
Network data speed	
RS 485/RS422	9600 baud max.
digital current loop	4800 baud max.

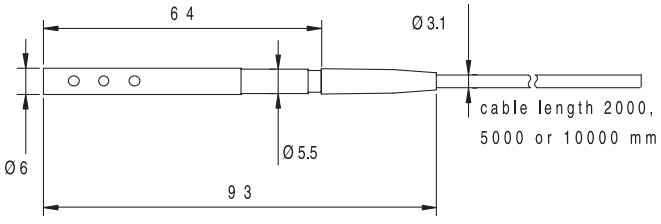
Dimensions

Dimensions in mm.

Electronics housing



Optional temperature probe for HMP243 and HMP247



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HMP243 and HMP247 Dewpoint Transmitters for Condensing Environments

The HMP243 Transmitter is suitable for outdoor applications.

HMP243 for Condensing Environments and Outdoor Applications

The HMP243 probe is suitable for use in outdoor/meteorological applications where sudden temperature changes and windy conditions can occur.

HMP243 can be installed using HMP243FA installation kit. The kit consists of a flange and a supporting bar for the sensor head cable; using this kit the distance between the sensor head and the channel or duct wall can be easily adjusted.

HMP243 is available also with a meteorolocal installation kit.

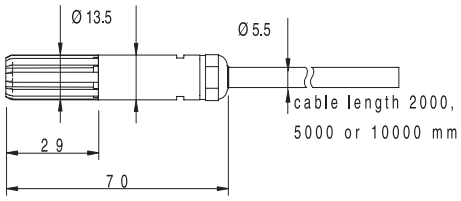
Technical Data

Sensor head material	PPS
Installation kit for duct mounting	HMP243FA
Meteorological installation kit	HMP243MIK

Dimensions

Dimension in mm.

HMP243 humidity probe



The HMP247 Transmitter is designed for demanding industrial applications.

HMP247 for Pressurized Spaces and High Humidity/ Condensing Environments

HMP247 is intended for demanding industrial humidity measurement applications with a risk of condensation.The stainless steel probe head is mechanically very durable and preferred for most industrial applications. The HMP247 probe head is leak-proof up to 1 MPa.

The HMP247 probe head can be installed also using the M3 threaded holes on the back of the probe.

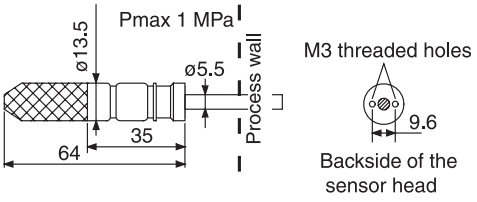
Technical Data

Pressure range	
Humidity probe	0...1 MPa
(the entire sensor head in pressurized space	0...10 bar, 0...145 psi)
Temperature probe	0...0.7 MPa
(the entire sensor head in pressurized space	0...7 bar, 0...100 psi)
Sensor head material	stainless steel (AISI 316L)

Dimensions

Dimension in mm.

HMP247 humidity probe (pressure tight)



Options

Calibration

Fast one-point calibration for HMP240 Series Transmitters can be done with Vaisala's hand-held humidity meter without disturbing the operation. A two-point calibration can be performed in a controlled environment using Vaisala's HMK15 Salt Bath Calibrator. The transmitters can also be sent to Vaisala Service Centers for multi-point calibration and adjustment against standards traceable to national standards.

The recommended calibration interval for the HMP240 Series Transmitters is one year.

Sensor re-gaining option minimizes the effect of contaminants

The HUMICAP® Sensor used in the HMP240 Series is ideal for the condensing applications, both in industry and meteorology. However, where chemicals or other agents could contaminate the sensor a sensor re-gaining option is available.

The sensor re-gaining option helps to maintain the accuracy and stability of the HMP240 Transmitters in environments with high concentrations of chemicals and cleaning agents

During sensor re-gaining the performance of the sensor in returned to normal by evaporating harmful chemicals from the sensor. The sensor re-gainig can be initiated using a software command or it can be programmed to occur at set intervals.

HMP243MIK Meteorological Installation Kit

In weather observations dew formation makes reliable humidity measurement difficult or even impossible. At a weather station high humidity combined with rapidly changing outdoor temperature can cause dew formation onto the sensor head. It is impossible to obtain a true reading until this dew evaporates or dries.

Obtaining a true humidity reading is particularly important e.g. in traffic safety: at airports and at sea as well as on the roads. It is essential, for example, in fog and frost prediction.

Vaisala's HMP243 dewpoint transmitter is optimized for measurement in high humidities, i.e. when ambient temperature is near dewpoint temperature.

The probe head of the HMP243 is mounted in a specially designed radiation shield. This shield is open at the bottom, which ensures steady air circulation to the sensor even in calm weather.

In traditional radiation shields sleet or snow can accumulate on the shield and prevent the proper air circulation through the shield, and so create a microclimate which has a very high humidity until the snow melts away. The open structure of the Vaisala radiation shield prevents this as the snow can not block the air circulation in the shield. The open structure can be used when the measurement is not temperature dependent.

All these characteristics combined make the HMP243 Transmitter the right choice for accurate and reliable measurement in extreme weather conditions.

HMP243MIK provides radiation shields for dewpoint and temperature probes.

Dewpoint Measurement with Relative Humidity Sensor

The HMP240 Series use the HUMICAP® relative humidity polymer sensor. As the sensor head is warmed, the relative humidity inside the sensor head stays below that of the ambient: with accurate temperature control the dewpoint of the ambient can be measured directly.

To achieve the true ambient relative humidity, an additional temperature sensor head can be used. The measured ambient temperature provides the needed temperature compensation for calculating relative humidity and other humidity parameters.