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HMP3 General Purpose Humidity and Temperature Probe

Vaisala HUMICAP® Humidity and Temperature Probe HMP3 is a general purpose probe designed for various industrial processes. The probe structure allows for replacing the sensor without tools, making it suitable for applications such as paint booths and other industrial applications where periodic recalibration alone is not sufficient for maintaining the probe performance. Other suitable applications include, for example, industrial HVAC systems, cleanrooms, and environmental chambers.

Designed for field maintenance

Probe design allows for several operating environments and flexible field maintenance. Filter and HUMICAP® R2 sensor element are field replaceable for applications that require frequent replacements. Calibration and adjustment of humidity measurement is also needed if the HUMICAP® R2 sensor is replaced. The following filter types are recommended for HMP3:

- Stainless steel mesh filter (12 µm mesh size) for typical applications such as air handling units
- Sintered stainless steel filter for applications where maximal protection from dust ingress is essential
- PPS plastic grid filter for best humidity response time

Chemical purge available with composite sensors

If purchased with a composite sensor instead of the field replaceable HUMICAP® R2 sensor, HMP3 can use the chemical purge feature. In environments with high concentrations of chemicals and cleaning agents, the chemical purge option helps to maintain measurement accuracy between calibration intervals.

The chemical purge involves heating the sensor to remove harmful chemicals. The function can be initiated manually or programmed to occur at set intervals.

Flexible connectivity

The probe is compatible with Vaisala Indigo series transmitters, and it can be used as a standalone digital Modbus RTU transmitter over RS-485 serial bus. For easy-to-use access to field calibration, device analytics, and configuration functionality, the probe can be connected to Vaisala Insight software for Windows®. For more information, see www.vaisala.com/insight.

DNV GL type approval certificate no. TAA00002YT

Technical data

Measurement performance

Relative humidity

Measurement range	0 ... 100 %RH
Accuracy at +23 °C (+73.4 °F) [1]	±0.8 %RH (0 ... 90 %RH)
Factory calibration uncertainty [2]	±0.5 %RH (0 ... 40 %RH) ±0.8 %RH (40 ... 95 %RH)
T_{63} response time	15 s
Sensor options	HUMICAP® R2 HUMICAP® R2C [3] HUMICAP® 180VC [3] [4]

Temperature

Sensor	Pt100 RTD Class F0.1 IEC 60751
Measurement range	−40 ... +120 °C (−40 ... +248 °F)
Accuracy [1]	±0.1 °C (±0.18 °F)
Factory calibration uncertainty [2]	±0.1 °C (±0.18 °F) at +23 °C (+73.4 °F)

1) Defined against calibration reference. Including non-linearity, hysteresis, and repeatability.
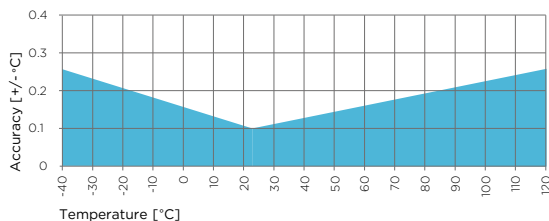2) Defined as ±2 standard deviation limits. Small variations possible; see calibration certificate.
3) Chemical purge feature available with this sensor.
4) H_2O_2 resistant. With HUMICAP® 180VC sensor, accuracy is not specified below −20 °C (−4 °F) operating temperature.
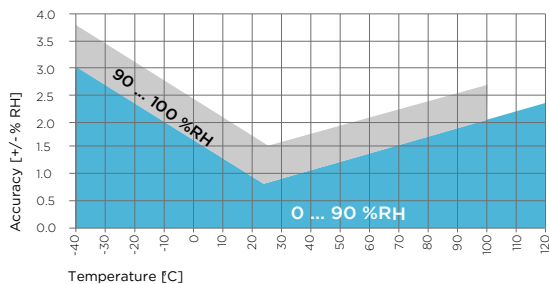
HMP3 humidity measurement accuracy as a function of temperature

HMP3 temperature measurement accuracy over full range

Operating environment

Operating temperature of probe head	−40 ... +120 °C (−40 ... +248 °F)
Operating temperature of probe body	−40 ... +80 °C (−40 ... +176 °F)
Storage temperature	−40 ... +80 °C (−40 ... +176 °F)
Operating environment	Suitable for outdoor use
Measurement environment	For air, nitrogen, hydrogen, argon, helium, and oxygen [1]
IP rating of probe body	IP66

1) Consult Vaisala if other chemicals are present. Consider safety regulations with flammable gases.

Inputs and outputs

Operating voltage	15 ... 30 V DC
Current consumption	10 mA typical, 500 mA max.
Digital output	RS-485, non-isolated
Protocols	Modbus RTU

Output parameters

Absolute humidity (g/m³)	Relative humidity (%RH)
Absolute humidity at NTP (g/m³)	Relative humidity (dew/frost) (%RH)
Dew point temperature (°C)	Temperature (°C)
Dew/frost point temperature (°C)	Water concentration (ppm$_v$)
Dew/frost point temperature at 1 atm (°C)	Water concentration (wet basis) (vol-%)
Dew point temperature at 1 atm (°C)	Water mass fraction (ppm$_w$)
Dew point temperature difference (°C)	Water vapor pressure (hPa)
Enthalpy (kJ/kg)	Water vapor saturation pressure (hPa)
Mixing ratio (g/kg)	Wet-bulb temperature (°C)

Compliance

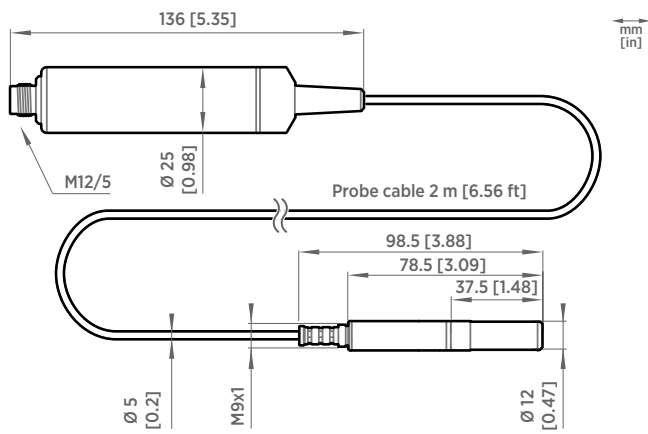|	
EU directives	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
EMC compatibility	EN 61326-1, industrial environment
Type approvals	DNV GL certificate no. TAA00002YT
Compliance marks	CE, China RoHS, RCM

Mechanical specifications

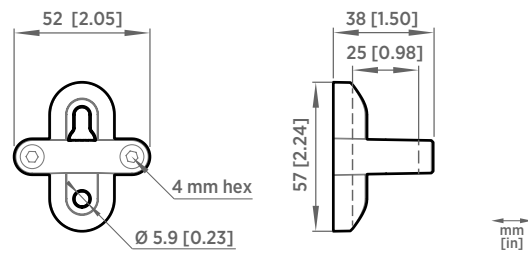|	
Connector	M12 5-pin A-coded male
Weight	302 g (10.65 oz)
Materials	
Probe	AISI 316L
Probe body	AISI 316L
Cable jacket	FEP

Accessories

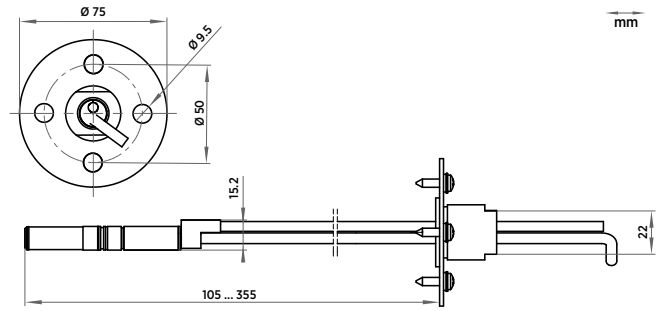|	
Duct installation kit	210697
Solar radiation shield DTR502B	DTR502B
Indigo USB adapter [1]	USB2

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

136 [5.35]

mm [in]

M12/5

Ø 25 [0.98]

Probe cable 2 m [6.56 ft]

98.5 [3.88]

78.5 [3.09]

37.5 [1.48]

Ø 5 [0.2]

M9x1

Ø 12 [0.47]

HMP3 probe dimensions

Ø 75

Ø 9.5

Ø 50

15.2

22

105 ... 355

mm

Duct installation kit 210697 dimensions with probe

52 [2.05]

4 mm hex

Ø 5.9 [0.23]

38 [1.50]

25 [0.98]

57 [2.24]

mm [in]

Probe holder ASM213582 dimensions

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HMP4 Relative Humidity and Temperature Probe

For pressurized and vacuum processes

Vaisala HUMICAP® Humidity and Temperature Probe HMP4 is designed for high-pressure applications such as compressed air systems in maritime, breathing air, and industrial applications, where measurement performance and chemical tolerance are essential.

Proven Vaisala HUMICAP® performance

Vaisala is the original innovator of the thin-film capacitive humidity measurement technology, which has now become the industry standard in humidity measurement.

HUMICAP® technology results from Vaisala's 40-year experience in industrial humidity measurement, providing the best stability, fast response time, and low hysteresis in a wide range of applications.

Chemical purge minimizes effects of contaminants

In environments with high concentrations of chemicals and cleaning agents, the chemical purge option helps to maintain measurement accuracy between calibration intervals.

The chemical purge involves heating the sensor to remove harmful chemicals. The function can be initiated manually or programmed to occur at set intervals.

Flexible connectivity

The probe is compatible with Vaisala Indigo series transmitters, and it can be used as a standalone digital Modbus RTU transmitter over RS-485 serial bus. For easy-to-use access to field calibration, device analytics, and configuration functionality, the probe can be connected to Vaisala Insight software for Windows®. For more information, see www.vaisala.com/insight.

Vaisala Indigo product family

Indigo transmitters extend the capabilities of Indigo compatible measurement probes. The transmitters can display measurements on the spot as well as transmit them to automation systems through analog signals, digital outputs, and relays. Cable length between probe and transmitter can be extended to up to 30 meters. For more information, see www.vaisala.com/indigo.


DNV GL type approval certificate no. TAA00002YT

Technical data

Measurement performance

Relative humidity

Measurement range	0 … 100 %RH
Accuracy at +23 °C (+73.4 °F) [1]	±0.8 %RH (0 … 90 %RH)
Factory calibration uncertainty [2]	±0.5 %RH (0 … 40 %RH) ±0.8 %RH (40 … 95 %RH)
T_{63} response time	15 s
Sensor options	HUMICAP® R2 HUMICAP® R2C [3]

Temperature

Measurement range	−70 … +180 °C (−94 … +356 °F)
Accuracy [1]	±0.1 °C (±0.18 °F)
Factory calibration uncertainty [2]	±0.1 °C (±0.18 °F) at +23 °C (+73.4 °F)
Sensor	Pt100 RTD Class F0.1 IEC 60751

1) Defined against calibration reference. Including non-linearity, hysteresis, and repeatability.
2) Defined as ±2 standard deviation limits. Small variations possible; see calibration certificate.
3) Chemical purge feature available with this sensor.
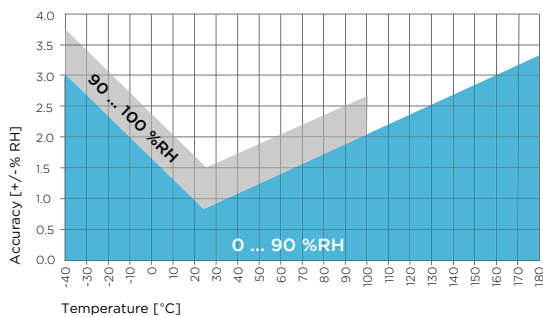
HMP4 humidity measurement accuracy as a function of temperature
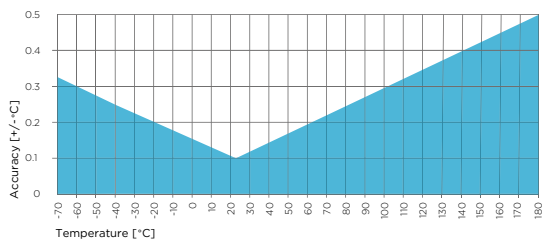
HMP4 temperature measurement accuracy over full range

Operating environment

Operating temperature of probe body	−40 … +80 °C (−40 … +176 °F)
Operating temperature of probe head	−70 … +180 °C (−94 … +356 °F)
Operational pressure	< 100 bar
Operating environment	Suitable for outdoor use
Measurement environment	For air, nitrogen, hydrogen, argon, helium, oxygen, and vacuum [1]
IP rating of probe body	IP66

1) Consult Vaisala if other chemicals are present. Consider safety regulations with flammable gases.

Inputs and outputs

Operating voltage	15 … 30 V DC
Current consumption	10 mA typical, 500 mA max.
Digital output	RS-485, non-isolated
Protocols	Modbus RTU

Output parameters

Absolute humidity (g/m³)	Relative humidity (%RH)
Absolute humidity at NTP (g/m³)	Relative humidity (dew/frost) (%RH)
Dew point temperature (°C)	Temperature (°C)
Dew/frost point temperature (°C)	Water concentration (ppm$_v$)
Dew/frost point temperature at 1 atm (°C)	Water concentration (wet basis) (vol-%)
Dew point temperature at 1 atm (°C)	Water mass fraction (ppm$_w$)
Dew point temperature difference (°C)	Water vapor pressure (hPa)
Enthalpy (kJ/kg)	Water vapor saturation pressure (hPa)
Mixing ratio (g/kg)	Wet-bulb temperature (°C)

Compliance

EU directives	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
EMC compatibility	EN 61326-1, industrial environment
Type approvals	DNV GL certificate no. TAA00002YT
Compliance marks	CE, China RoHS, RCM

Mechanical specifications

Connector	M12 5-pin A-coded male
Fitting body	M22×1.5 or NPT1/2"
Weight	530 g (18.7 oz)
Materials	
Probe	AISI 316
Probe body	AISI 316
Cable jacket	FEP

Accessories

Indigo USB adapter [1]	USB2

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

136 [5.35]

mm
[in]

Ø 25
[0.98]

M12/5

Probe cable 2 m [6.56 ft]

Ø 12
[0.47]

183 [7.20]

120 [4.72]

41 [1.61]

Ø 5
[0.2]

32 mm   27 mm

**Fitting body NPT1/2" or M22×1.5
with sealing ring Ø22×27×1.5 Cu**

HMP4 probe dimensions

52 [2.05]

38 [1.50]

25 [0.98]

57 [2.24]

4 mm hex

Ø 5.9 [0.23]

mm
[in]

Probe holder ASM213582 dimensions

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HMP5 Relative Humidity and Temperature Probe

For high temperatures

Features

- RH accuracy up to ±0.8 %RH
- Temperature accuracy up to ±0.1 °C (±0.18 °F)
- Temperature measurement range −70 ... +180 °C (−94 ... +356 °F)
- Operating temperature of probe body −40 ... +80 °C (−40 ... +176 °F)
- Sensor purge provides superior chemical resistance
- Modbus® RTU over RS-485
- 250-mm (9.84 in) probe allows easy process installation through insulation
- Compatible with Indigo series transmitters and Insight PC software
- Traceable calibration certificate: 6 points for humidity, 1 point for temperature

Vaisala HUMICAP® Humidity and Temperature Probe HMP5 is designed for high-temperature applications such as baking ovens, pasta dryers, and industrial drying kilns, where measurement performance and chemical tolerance are essential.

Proven Vaisala HUMICAP® performance

Vaisala is the original innovator of the thin-film capacitive humidity measurement technology, which has now become the industry standard in humidity measurement.

HUMICAP® technology results from Vaisala's 40-year experience in industrial humidity measurement, providing the best stability, fast response time, and low hysteresis in a wide range of applications.

Chemical purge minimizes effects of contaminants

In environments with high concentrations of chemicals and cleaning agents, the chemical purge option helps to maintain measurement accuracy between calibration intervals.

The chemical purge involves heating the sensor to remove harmful chemicals. The function can be initiated manually or programmed to occur at set intervals.

Flexible connectivity

The probe is compatible with Vaisala Indigo series transmitters, and it can be used as a standalone digital Modbus RTU transmitter over RS-485 serial bus. For easy-to-use access to field calibration, device analytics, and configuration functionality, the probe can be connected to Vaisala Insight software for Windows®. For more information, see www.vaisala.com/insight.

Vaisala Indigo product family

Indigo transmitters extend the capabilities of Indigo compatible measurement probes. The transmitters can display measurements on the spot as

well as transmit them to automation systems through analog signals, digital outputs, and relays. Cable length between probe and transmitter can be extended to up to 30 meters. For more information, see www.vaisala.com/indigo.

DNV GL type approval certificate no. TAA00002YT

Technical data

Measurement performance

Relative humidity

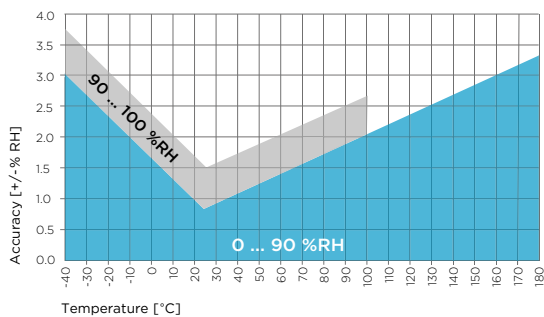|	
Measurement range	0 ... 100 %RH
Accuracy at +23 °C (+73.4 °F) [1]	±0.8 %RH (0 ... 90 %RH)
Factory calibration uncertainty [2]	±0.5 %RH (0 ... 40 %RH) ±0.8 %RH (40 ... 95 %RH)
T$_{63}$ response time	15 s
Sensor options	HUMICAP® R2 HUMICAP® R2C [3]

Temperature

Measurement range	−70 ... +180 °C (−94 ... +356 °F)
Accuracy at +23 °C (+73.4 °F) [1]	±0.1 °C (±0.18 °F)
Factory calibration uncertainty [2]	±0.1 °C (±0.18 °F) at +23 °C (+73.4 °F)
Sensor	Pt100 RTD Class F0.1 IEC 60751

1) Defined against calibration reference. Including non-linearity, hysteresis, and repeatability.
2) Defined as ±2 standard deviation limits. Small variations possible; see calibration certificate.
3) Chemical purge feature available with this sensor.

HMP5 humidity measurement accuracy as a function of temperature
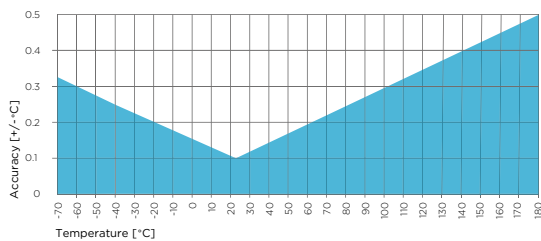
HMP5 temperature measurement accuracy over full range

Operating environment

Operating temperature of probe body	−40 ... +80 °C (−40 ... +176 °F)
Operating temperature of probe head	−70 ... +180 °C (−94 ... +356 °F)
Operating environment	Suitable for outdoor use
IP rating of probe body	IP66

Inputs and outputs

Operating voltage	15 ... 30 V DC
Current consumption	10 mA typical, 500 mA max.
Digital output	RS-485, non-isolated
Protocols	Modbus RTU

Output parameters

Absolute humidity (g/m^3)	Relative humidity (%RH)
Absolute humidity at NTP (g/m^3)	Relative humidity (dew/frost) (%RH)
Dew point temperature (°C)	Temperature (°C)
Dew/frost point temperature (°C)	Water concentration (ppm$_v$)
Dew/frost point temperature at 1 atm (°C)	Water concentration (wet basis) (vol-%)
Dew point temperature at 1 atm (°C)	Water mass fraction (ppm$_w$)
Dew point temperature difference (°C)	Water vapor pressure (hPa)
Enthalpy (kJ/kg)	Water vapor saturation pressure (hPa)
Mixing ratio (g/kg)	Wet-bulb temperature (°C)

Compliance

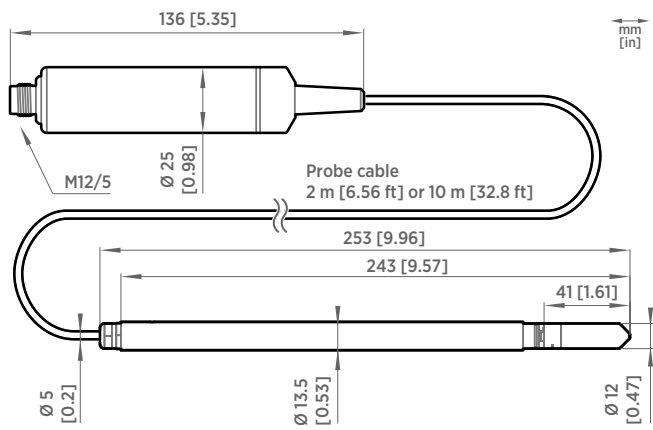|	
EU directives	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
EMC compatibility	EN 61326-1, industrial environment
Type approvals	DNV GL certificate no. TAA00002YT
Compliance marks	CE, China RoHS, RCM

Mechanical specifications

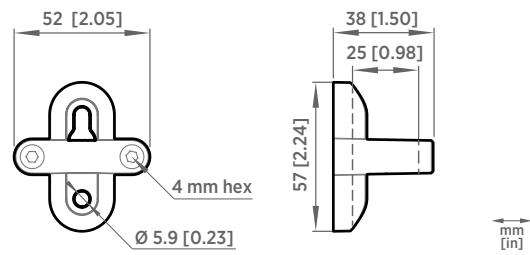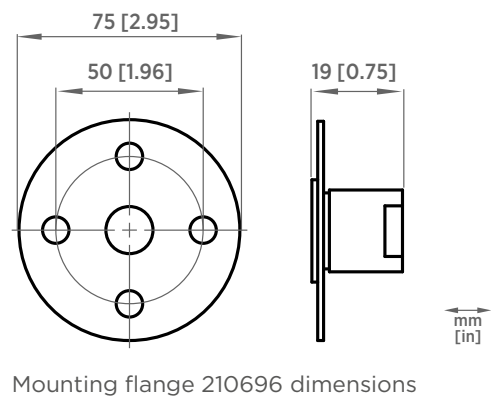|	
Connector	M12 5-pin A-coded male
Weight	436 g (15.37 oz)
Materials	
Probe	AISI 316L
Probe body	AISI 316L
Cable jacket	FEP

Accessories

Mounting flange	210696
Indigo USB adapter [1]	USB2

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

136 [5.35]

mm [in]

Ø 25 [0.98]

M12/5

Probe cable
2 m [6.56 ft] or 10 m [32.8 ft]

253 [9.96]

243 [9.57]

41 [1.61]

Ø 5 [0.2]

Ø 13.5 [0.53]

Ø 12 [0.47]

HMP5 probe dimensions

75 [2.95]

50 [1.96]

19 [0.75]

mm [in]

Mounting flange 210696 dimensions

52 [2.05]

4 mm hex

Ø 5.9 [0.23]

38 [1.50]

25 [0.98]

57 [2.24]

mm [in]

Probe holder ASM213582 dimensions

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VAISALA

HMP7 Relative Humidity and Temperature Probe

For high humidities

Vaisala HUMICAP® Humidity and Temperature Probe HMP7 is designed for applications that involve constant high humidity or rapid changes in humidity, such as drying and test chambers, combustion air, and other humidifiers and meteorological measurements, where measurement performance and chemical tolerance are essential.

Proven Vaisala HUMICAP® performance

Vaisala is the original innovator of the thin-film capacitive humidity measurement technology, which has now become the industry standard in humidity measurement.

HUMICAP® technology results from Vaisala's 40-year experience in industrial humidity measurement, providing the best stability, fast response time, and low hysteresis in a wide range of applications.

Avoiding condensation at extreme humidity

Probe heating functionality heats up not only the sensor, but the whole probe head. When probe temperature is heated above dew point temperature, condensation on the probe can be avoided while measuring the dew point

temperature of the process. By setting the temperature compensation value obtained, for example, with the TMP1 temperature probe, true relative humidity at process temperature can be measured while avoiding condensation by elevated probe temperature.

Vaisala Indigo product family

Indigo transmitters extend the capabilities of Indigo compatible measurement probes. The transmitters can display measurements on the spot as well as transmit them to automation systems through analog signals, digital outputs, and relays. Cable length between probe and transmitter can be extended to up to 30 meters. For more information, see www.vaisala.com/ indigo.

Flexible connectivity

The probe is compatible with Vaisala Indigo series transmitters, and it can be used as a standalone digital Modbus RTU transmitter over RS-485 serial bus. For easy-to-use access to field calibration, device analytics, and configuration functionality, the probe can be connected to Vaisala Insight software for Windows®. For more information, see www.vaisala.com/insight.

DNV GL type approval certificate no. TAA00002YT
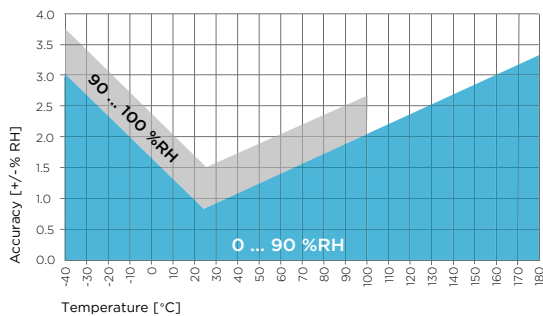
Technical data

Measurement performance

Relative humidity

Measurement range	0 ... 100 %RH
Accuracy at +23 °C (+73.4 °F) [1]	±0.8 %RH (0 ... 90 %RH)
Factory calibration uncertainty [2]	±0.5 %RH (0 ... 40 %RH)
	±0.8 %RH (40 ... 95 %RH)
T_{63} response time	15 s
Sensor options	HUMICAP® R2
	HUMICAP® R2C [3]
	HUMICAP® 180VC [3] [4]

Temperature

Measurement range	−70 ... +180 °C (−94 ... +356 °F)
Accuracy at +23 °C (+73.4 °F) [1]	±0.1 °C (±0.18 °F)
Factory calibration uncertainty [2]	±0.1 °C (±0.18 °F) at +23 °C (+73.4 °F)
Sensor	Pt100 RTD Class F0.1 IEC 60751

1) Defined against calibration reference. Including non-linearity, hysteresis, and repeatability.
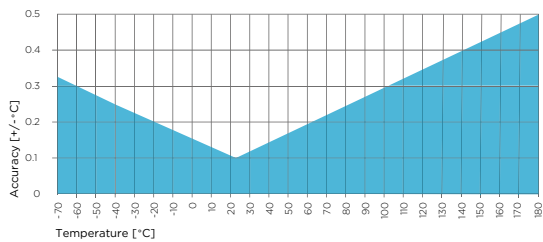2) Defined as ±2 standard deviation limits. Small variations possible; see calibration certificate.
3) Chemical purge feature available with this sensor.
4) H_2O_2 resistant. With HUMICAP® 180VC sensor, accuracy is not specified below −20 °C (−4 °F) operating temperature.

HMP7 humidity measurement accuracy as a function of temperature

HMP7 temperature measurement accuracy over full range

Operating environment

Operating temperature of probe body	−40 ... +80 °C (−40 ... +176 °F)
Operating temperature of probe head	−70 ... +180 °C (−94 ... +356 °F)
Operational pressure	< 10 bar
Operating environment	Suitable for outdoor use
Measurement environment	For air, nitrogen, hydrogen, argon, helium, oxygen, and vacuum [1]
IP rating of probe body	IP66

1) Consult Vaisala if other chemicals are present. Consider safety regulations with flammable gases.

Inputs and outputs

Operating voltage	18 ... 30 V DC
Current consumption	10 mA typical, 500 mA max.
Digital output	RS-485, non-isolated
Protocols	Modbus RTU

Output parameters

Absolute humidity (g/m³)	Relative humidity (%RH)
Absolute humidity at NTP (g/m³)	Relative humidity (dew/frost) (%RH)
Dew point temperature (°C)	Temperature (°C)
Dew/frost point temperature (°C)	Water concentration (ppm$_v$)
Dew/frost point temperature at 1 atm (°C)	Water concentration (wet basis) (vol-%)
Dew point temperature at 1 atm (°C)	Water mass fraction (ppm$_w$)
Dew point temperature difference (°C)	Water vapor pressure (hPa)
Enthalpy (kJ/kg)	Water vapor saturation pressure (hPa)
Mixing ratio (g/kg)	Wet-bulb temperature (°C)

Compliance

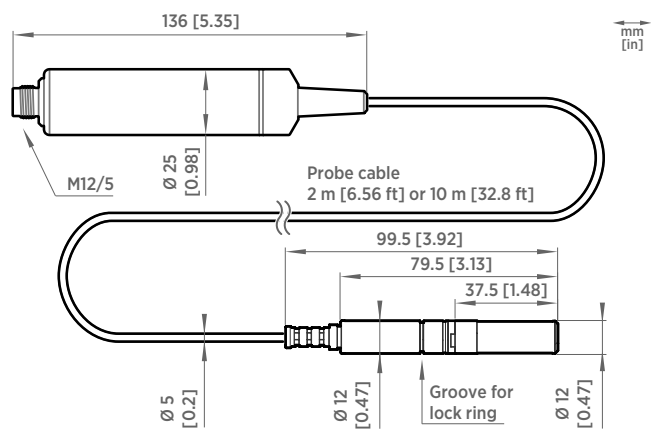|	
EU directives	EMC Directive (2014/30/EU)
	RoHS Directive (2011/65/EU) amended by 2015/863
EMC compatibility	EN 61326-1, industrial environment
Type approvals	DNV GL certificate no. TAA00002YT
Compliance marks	CE, China RoHS, RCM

Mechanical specifications

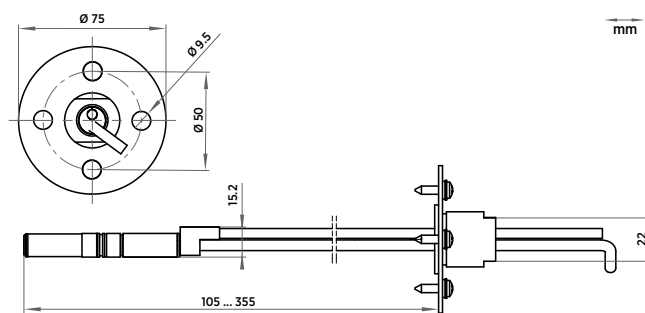|	
Connector	M12 5-pin A-coded male
Weight	310 g (10.9 oz)
Materials	
Probe	AISI 316L
Probe body	AISI 316L
Cable jacket	FEP

Accessories

Duct installation kit for RH probe	210697
Solar radiation shield DTR502B	DTR502B
Cable gland M20×1.5 with split seal	HMP247CG
Swagelok® for 12 mm probe, 1/2" ISO thread	SWG12ISO12
Swagelok® for 12 mm probe, 3/8" ISO thread	SWG12ISO38
Swagelok® for 12 mm probe, 1/2" NPT thread	SWG12NPT12
Indigo USB adapter [1]	USB2

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

mm
[in]

136 [5.35]

Ø 25 [0.98]

M12/5

Probe cable
2 m [6.56 ft] or 10 m [32.8 ft]

99.5 [3.92]

79.5 [3.13]

37.5 [1.48]

Ø 5 [0.2]

Ø 12 [0.47]

Groove for lock ring

Ø 12 [0.47]

HMP7 probe dimensions

mm

Ø 75

Ø 9.5

Ø 50

15.2

22

105 ... 355

Duct installation kit 210697 dimensions with probe

www.vaisala.com

VAISALA

HMP8 Relative Humidity and Temperature Probe
For pressurized and vacuum processes

Features

- RH accuracy up to ±0.8 %RH
- Temperature accuracy up to ±0.1 °C (±0.18 °F)
- Operating pressure 0 … 4 MPa (0 … 40 bar)
- Temperature measurement range −70 … +180 °C (−94 … +356 °F)
- Sensor purge provides superior chemical resistance
- Probe installation depth can be freely adjusted and probe can be hot-swapped from pressurized pipelines with an installation valve
- Modbus® RTU over RS-485
- Compatible with Indigo transmitters and Insight PC software
- Traceable calibration certificate: 6 points for humidity, 1 point for temperature

Vaisala HUMICAP® Humidity and Temperature Probe HMP8 is designed for pressurized applications in compressed air systems, refrigerant dryers, and other pressurized industrial applications, where easy insertion and removal of the probe and adjustable installation depth into the pipeline are needed.

Proven Vaisala HUMICAP® performance

Vaisala is the original innovator of the thin-film capacitive humidity measurement technology, which has now become the industry standard in humidity measurement.

HUMICAP® technology results from Vaisala's 40-year experience in industrial humidity measurement, providing the best stability, fast response time, and low hysteresis in a wide range of applications.

Chemical purge minimizes effects of contaminants

In environments with high concentrations of chemicals and cleaning agents, the chemical purge option helps to maintain measurement accuracy between calibration intervals.

The chemical purge involves heating the sensor to remove harmful chemicals. The function can be initiated manually or programmed to occur at set intervals.

Flexible connectivity

The probe is compatible with Vaisala Indigo series transmitters, and it can be used as a standalone digital Modbus RTU transmitter over RS-485 serial bus. For easy-to-use access to field calibration, device analytics, and configuration functionality, the probe can be connected to Vaisala Insight software for Windows®. For more information, see www.vaisala.com/insight.

Vaisala Indigo product family

Indigo transmitters extend the capabilities of Indigo compatible measurement probes. The transmitters can display measurements on the spot as

well as transmit them to automation systems through analog signals, digital outputs, and relays. Cable length between probe and transmitter can be extended to up to 30 meters. For more information, see www.vaisala.com/indigo.
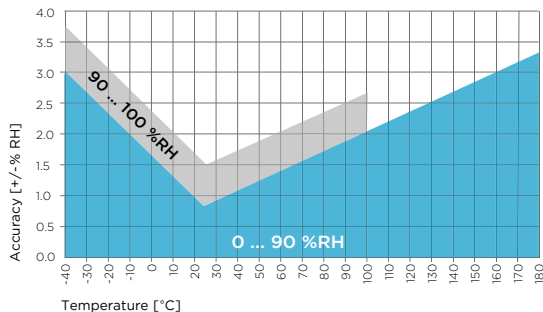

DNV GL type approval certificate no. TAA00002YT

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Technical data

Measurement performance

Relative humidity

Measurement range	0 ... 100 %RH
Accuracy at +23 °C (+73.4 °F) [1]	±0.8 %RH (0 ... 90 %RH)
Factory calibration uncertainty [2]	±0.5 %RH (0 ... 40 %RH) ±0.8 %RH (40 ... 95 %RH)
T_{63} response time	15 s
Sensor options	HUMICAP® R2 HUMICAP® R2C [3]

Temperature

Measurement range	−70 ... +180 °C (−94 ... +356 °F)
Accuracy at +23 °C (+73.4 °F) [1]	±0.1 °C (±0.18 °F)
Factory calibration uncertainty [2]	±0.1 °C (±0.18 °F) at +23 °C (+73.4 °F)
Sensor	Pt100 RTD Class F0.1 IEC 60751

1) Defined against calibration reference. Including non-linearity, hysteresis, and repeatability.
2) Defined as ±2 standard deviation limits. Small variations possible; see calibration certificate.
3) Chemical purge feature available with this sensor.

HMP8 humidity measurement accuracy as a function of temperature
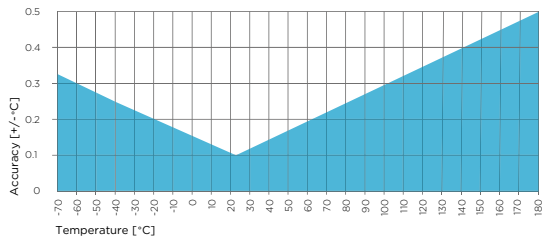
HMP8 temperature measurement accuracy over full range

Operating environment

Operating temperature of probe body	−40 ... +80 °C (−40 ... +176 °F)
Operating temperature of probe head	−70 ... +180 °C (−94 ... +356 °F)
Operational pressure	< 40 bar
Operating environment	Suitable for outdoor use
Measurement environment	For air, nitrogen, hydrogen, argon, helium, oxygen, and vacuum [1]
IP rating of probe body	IP66

1) Consult Vaisala if other chemicals are present. Consider safety regulations with flammable gases.

Inputs and outputs

Operating voltage	15 ... 30 V DC
Current consumption	10 mA typical, 500 mA max.
Digital output	RS-485, non-isolated
Protocols	Modbus RTU

Output parameters

Absolute humidity (g/m³)	Relative humidity (%RH)
Absolute humidity at NTP (g/m³)	Relative humidity (dew/frost) (%RH)
Dew point temperature (°C)	Temperature (°C)
Dew/frost point temperature (°C)	Water concentration (ppm$_v$)
Dew/frost point temperature at 1 atm (°C)	Water concentration (wet basis) (vol-%)
Dew point temperature at 1 atm (°C)	Water mass fraction (ppm$_w$)
Dew point temperature difference (°C)	Water vapor pressure (hPa)
Enthalpy (kJ/kg)	Water vapor saturation pressure (hPa)
Mixing ratio (g/kg)	Wet-bulb temperature (°C)

Compliance

EU directives	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
EMC compatibility	EN 61326-1, industrial environment
Type approvals	DNV GL certificate no. TAA00002YT
Compliance marks	CE, China RoHS, RCM

Mechanical specifications

Connector	M12 5-pin A-coded male
Probe fitting	ISO1/2" and NPT1/2" fittings included
Weight	512 g (18.1 oz)
Materials	
Probe	AISI 316L
Probe body	AISI 316L
Cable jacket	FEP

Accessories

Ball valve ISO 1/2" with welding joint	BALLVALVE-1
Indigo USB adapter [1]	USB2

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

136 [5.35]

Ø 5 [0.2]

mm [in]

M12/5

Ø 25 [0.98]

Probe cable 2 m [6.56 ft]

268 [10.55]

230 [9.06]

41 ... 185 [1.16 ... 7.28]

41 [1.61]

Fitting body
ISO1/2" or NPT1/2"

Ø 13.5 [0.53]

Ø 12 [0.47]

HMP8 probe dimensions

80 [3.15]

ISO 1/2"

195 [7.67]

Ø 14 [0.55]

Ø 14 [0.55]

Ø 21.5 [0.83]
(drilling)

mm [in]

Ball valve kit dimensions

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# HMP9 Compact Humidity and Temperature Probe

Vaisala HUMICAP® Humidity and Temperature Probe HMP9 is designed for easy installation into rapidly changing environments where fast response time, measurement performance, and chemical tolerance are essential.

Miniatyre probe head with HUMICAP® performance

The main feature of HMP9 is its 5 mm (0.2 in) diameter miniature probe head. Despite the small footprint, the probe head contains a HUMICAP® sensor that provides its industry standard humidity measurement performance.

HMP9 has great stability, fast response time, and low hysteresis in a wide range of applications. This makes it the superior choice in applications where the mechanical properties or replaceable filters of the heavier probes are not needed.

Measurement environments where occasional condensation is present are not a problem as long as the probe is protected from exposure to liquid water. For continuously condensing environments, use HMP7 with probe heating instead.
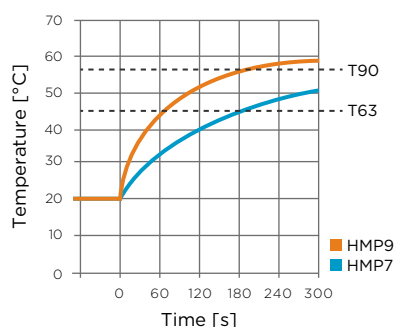
HMP9 T response time compared to HMP7

Chemical purge minimizes effects of contaminants

In environments with high concentrations of chemicals and cleaning agents, the chemical purge option helps to maintain measurement accuracy between calibration intervals.

The chemical purge involves heating the sensor to remove harmful chemicals. The function can be initiated manually or programmed to occur at set intervals.

Flexible connectivity

The probe is compatible with Vaisala Indigo series transmitters, and it can be used as a standalone digital Modbus RTU transmitter over RS-485 serial bus. For easy-to-use access to field calibration, device analytics, and configuration functionality, the probe can be connected to Vaisala Insight software for Windows®. For more information, see www.vaisala.com/insight.

Technical data

## Measurement performance

Relative humidity

|	
Measurement range	0 ... 100 %RH
Accuracy at +23 °C (+73.4 °F) [1]	±0.8 %RH (0 ... 90 %RH)
Factory calibration uncertainty [2]	±0.7 %RH (0 ... 40 %RH) ±1 %RH (40 ... 95 %RH)
T_{63} response time [3]	15 s
Sensor	HUMICAP® I

Temperature

Measurement range	−40 ... +120 °C (−40 ... +248 °F)
Accuracy at +23 °C (+73.4 °F) [1]	±0.1 °C (±0.18 °F)
Factory calibration uncertainty [2]	±0.1 °C (±0.18 °F) at +23 °C (+73.4 °F)
T_{63} response time [3]	70 s

1) Defined against calibration reference. Including non-linearity, hysteresis, and repeatability.
2) Defined as ±2 standard deviation limits. Small variations possible; see calibration certificate.
3) In still air.
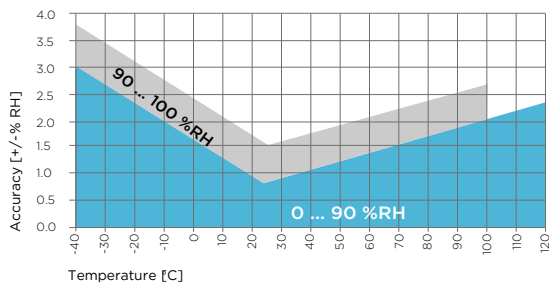
HMP9 humidity measurement accuracy as a function of temperature
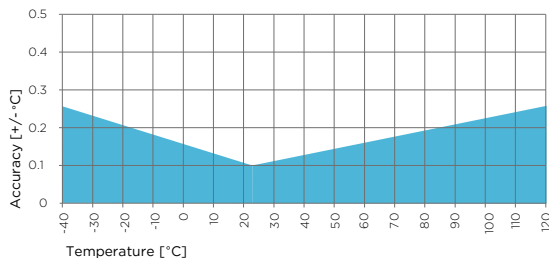
HMP9 temperature measurement accuracy over full range

Operating environment

Operating temperature of probe body	−40 ... +60 °C (−40 ... +140 °F)
Operating temperature of probe head	−40 ... +120 °C (−40 ... +248 °F)
Storage temperature	−40 ... +60 °C (−40 ... +140 °F)
Operating environment	Suitable for outdoor use when protected from rain
Measurement environment	For air, nitrogen, hydrogen, argon, helium, and oxygen [1]
IP rating of probe body	IP65

1) Consult Vaisala if other chemicals are present. Consider safety regulations with flammable gases.

Inputs and outputs

Operating voltage	15 ... 30 V DC
Current consumption	5 mA typical, 400 mA max.
Digital output	RS-485, non-isolated
Default serial settings	19200 bps N 8 2
Protocol	Modbus RTU

Output parameters

Absolute humidity (g/m³)	Relative humidity (%RH)
Absolute humidity at NTP (g/m³)	Relative humidity (dew/frost) (%RH)
Dew point temperature (°C)	Temperature (°C)
Dew/frost point temperature (°C)	Water concentration (ppm$_v$)
Dew/frost point temperature at 1 atm (°C)	Water concentration (wet basis) (vol-%)
Dew point temperature at 1 atm (°C)	Water mass fraction (ppm$_w$)
Dew point temperature difference (°C)	Water vapor pressure (hPa)
Enthalpy (kJ/kg)	Water vapor saturation pressure (hPa)
Mixing ratio (g/kg)	Wet-bulb temperature (°C)

Compliance

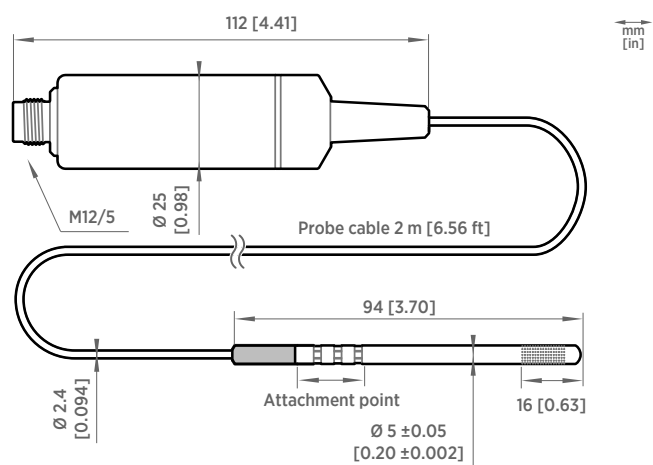|	
EU directives	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) amended by 2015/863
EMC compatibility	EN 61326-1, industrial environment
Compliance marks	CE, China RoHS, RCM

Mechanical specifications

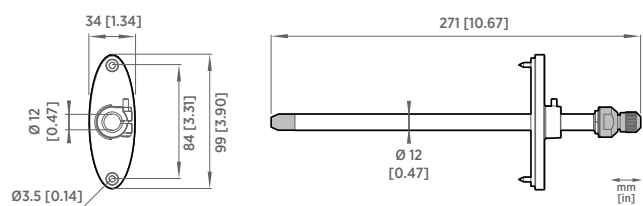|	
Connector	M12 5-pin A-coded male
Weight	68 g (2.40 oz)
Materials	
Probe	AISI 316L
Probe body	PBT
Cable overmolds	FEP

Accessories

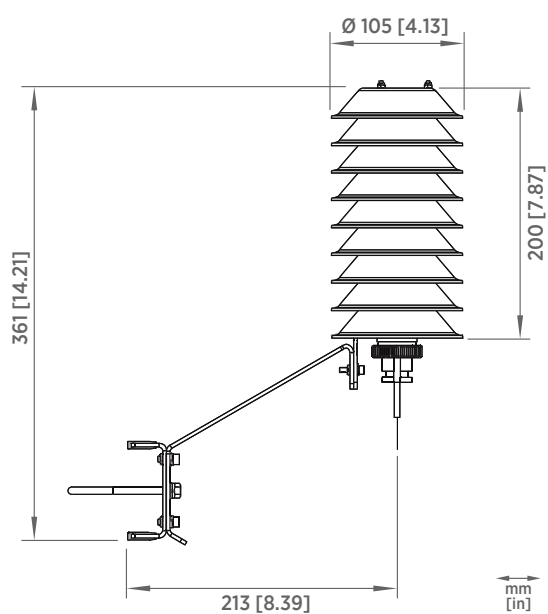|	
HMP9 calibration adapter for HMK15	ASM213801
HMP9 duct installation kit	ASM214055
Solar radiation shield DTR502B with sensor head support 215130	DTR502B and 215130
Indigo USB adapter [1]	USB2

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

112 [4.41]

mm
[in]

M12/5

Ø 25
[0.98]

Probe cable 2 m [6.56 ft]

94 [3.70]

Ø 2.4
[0.094]

Attachment point

16 [0.63]

Ø 5 ±0.05
[0.20 ±0.002]

HMP9 probe dimensions

34 [1.34]

Ø 12
[0.47]

84 [3.31]

99 [3.90]

Ø3.5 [0.14]

271 [10.67]

Ø 12
[0.47]

mm
[in]

HMP9 Duct Installation Kit ASM214055 dimensions

Ø 105 [4.13]

361 [14.21]

200 [7.87]

213 [8.39]

mm
[in]

Solar Radiation Shield DTR502B dimensions

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