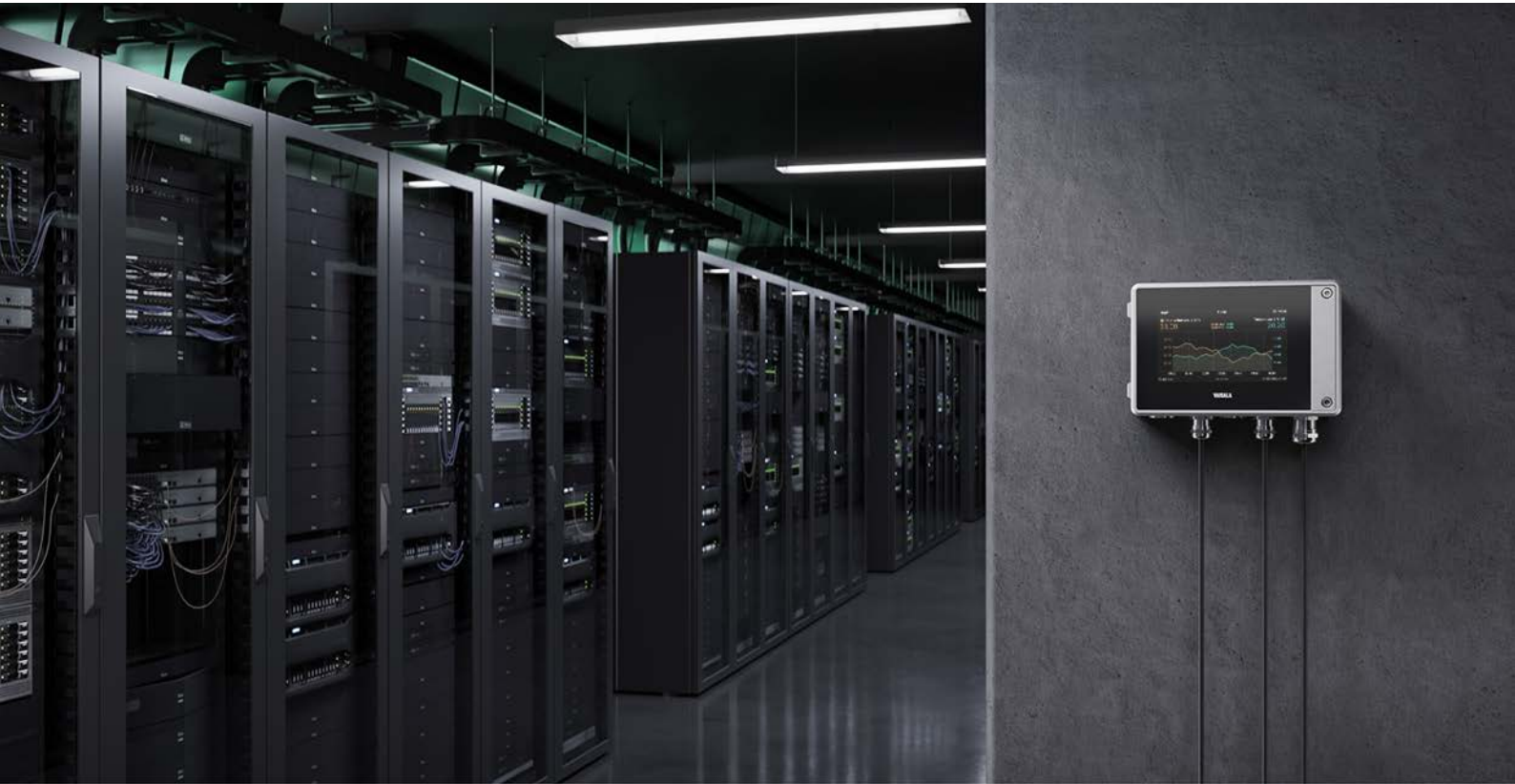


# Product Catalog

Humidity · Temperature · Dew point · Carbon dioxide  
Biogas quality · Moisture in oil · Hydrogen peroxide  
Pressure · Liquid concentration · Weather · Service offering

## INDUSTRIAL INSTRUMENTS



**VAISALA**



# Instruments and intelligence for industrial needs

## Vaisala Industrial Measurements

Vaisala's Industrial Measurements business area provides customers with visibility into their own processes. Our products provide them with accurate and reliable measurement data which enables them to make decisions for optimized industrial processes.

### Heating, ventilation, and air-conditioning (HVAC)

Vaisala offers industry benchmark HVAC transmitters for measuring humidity, temperature, and carbon dioxide indoors and outdoors. Customers use these instruments to optimize heating ventilation and air conditioning controls, for example, in offices, hospitals, data centers, factories, and cooling towers. Our transmitters help in maintaining good indoor air quality and saving costs through improved efficiency.

### Liquid measurements

Vaisala's cutting-edge Polaris™ process refractometers offer unparalleled reliability and performance in liquid concentration and density measurements for industrial manufacturing. Designed for seamless inline process control, our solutions are trusted across a wide range of demanding sectors, including pulp and paper, food and sugar production, semiconductors, pharmaceuticals, chemicals, oil refining, and petrochemicals.

### Life Cycle Services

Our Life Cycle Services provide comprehensive care through the life cycle of our measurement instruments. As a trusted partner to our global customers, we enable sustainable decisions by maintaining the most accurate measurement data throughout the entire product and system life cycle.

This product catalog provides an overview of our products to help you select what best suits your needs. For more information, visit us at [vaisala.com](https://vaisala.com) or contact us at [vaisala.com/requestinfo](https://vaisala.com/requestinfo). Product user documentation is available at [docs.vaisala.com](https://docs.vaisala.com).



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## LIQUID CONCENTRATION

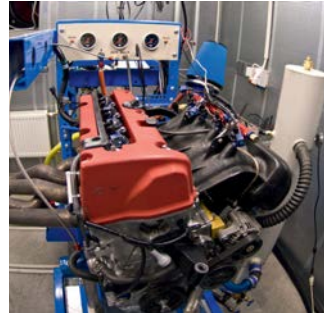
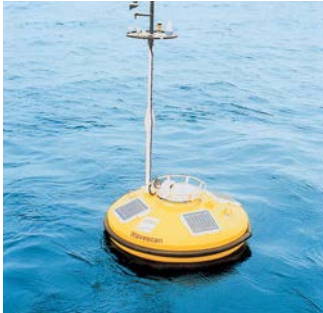
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### BAROCAP in brief

- Over 35 years of accurate pressure measurement
- Silicon-based capacitive sensor for absolute pressure measurement
- Barometric pressure range 500 ... 1100 hPa
- 50 ... 1100 hPa pressure range available for industrial applications
- Process pressure measurement range 1 ... 10 bar
- NIST-traceable pressure measurement

First introduced in 1985, Vaisala BAROCAP is a silicon-based micromechanical pressure sensor that offers reliable performance in a wide variety of applications, from meteorology to industrial measurements. Combining two powerful technologies – single-crystal silicon material and capacitive measurement – BAROCAP sensors feature low hysteresis combined with excellent accuracy and long-term stability.

### How it works

BAROCAP is a micromechanical sensor that uses dimensional changes in its silicon membrane to measure pressure. As the surrounding pressure increases or decreases, the membrane bends, thereby increasing or decreasing the height of the vacuum gap inside the sensor. The opposite sides of the vacuum gap act as electrodes, and as the distance between the two electrodes changes, the sensor capacitance changes. The capacitance is measured and converted into a pressure reading.

The BAROCAP sensor's properties – good elasticity, low hysteresis, excellent repeatability, low temperature dependence, and superior long-term stability – are the result of its single-crystal silicon material. The capacitive structure gives the sensor its wide dynamic range and provides a built-in mechanism for overpressure blocking.

### Typical applications for barometric pressure measurement

Barometric pressure measurement has a wide variety of applications within meteorology. Pressure data is required for estimating the amount of precipitable water vapor in the atmosphere. Typical applications include weather stations, data buoys, GPS meteorology, and environmental data logging. Barometric pressure measurement is also used in hydrology and agronomy applications.

Barometric pressure data is also required in several industrial applications. It is measured in pressure-sensitive industrial equipment, such as laser interferometers and lithography systems, aviation applications, and in exhaust-gas analysis. Metrological applications include laboratory pressure standard measurements and environmental monitoring in calibration laboratories.

Vaisala offers a range of professional-grade barometers for both indoor and outdoor use. BAROCAP barometers operate over a wide temperature range and perform reliably even in highly demanding applications such as professional meteorology and aviation. View the complete range of Vaisala barometers at [www.vaisala.com/pressure](http://www.vaisala.com/pressure).

### BAROCAP's unique benefits

- Low hysteresis, high repeatability
- Superior long-term stability
- Tolerates harsh conditions

**BAROCAP applications for measurements in pressurized systems**

Vaisala DRYCAP® dew point instruments have a long history of providing reliable and stable measurements in compressed air systems and SF6 insulation gas monitoring in high-voltage equipment. In addition to the need for dew point measurement, these two applications also share the need for accurate and stable pressure measurement. Vaisala has integrated its DRYCAP and BAROCAP technologies into a range of products that offer a unique combination of pressure and dew point measurement for pressurized systems.

In compressed air, combining dew point measurement with live process pressure data provides a unique advantage: The conversion of measured pressure dew point to atmospheric pressure or ppm unit is available online, eliminating the possibility of any ambiguity in the dew point data. This is important because changes in the pressure of the gas being monitored alter its dew point.

Combined dew point and pressure measurement in SF6 gas monitoring of high-voltage equipment provides a superior tool for assessing the condition of SF6 insulation. Leakages can be immediately detected and early warning

is given for moisture issues. Measuring dew point, pressure, and temperature enables the calculation of SF6 gas density, normalized pressure, dew point at atmospheric pressure, and ppm – all essential elements in SF6 monitoring.

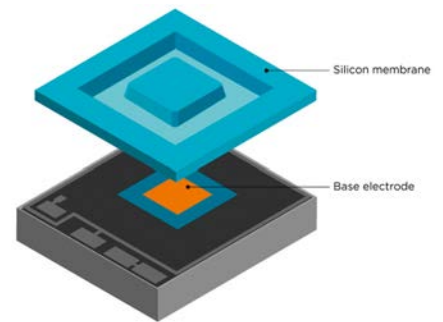
View the complete range of Vaisala products for combined pressure and dew point measurement at [www.vaisala.com/pressure](http://www.vaisala.com/pressure).

**The BAROCAP story**

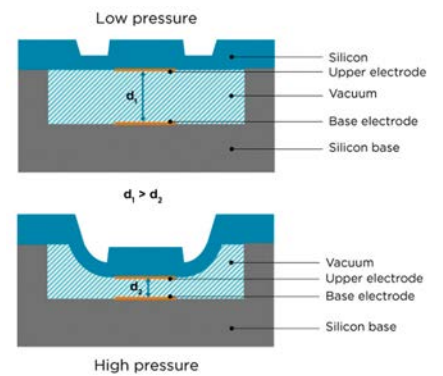
The story of BAROCAP began in the late 1970s during preliminary micromechanical pressure sensor studies for the new-generation Vaisala Radiosonde RS80. Micromechanics proved to be challenging, and Vaisala worked in close cooperation with universities and research institutes in Finland and internationally to develop a new pressure-sensing technology based on silicon processing. The critical breakthrough came on the brink of the project deadline. The first BAROCAP sensors were delivered to two icebreakers and the Helsinki Telephone Company.

BAROCAP sensors have traveled to places where no human has ever set foot, including as part of several Mars exploration missions and the Cassini-Huygens mission to explore Saturn and

its largest moon, Titan. BAROCAP's out-of-this-world journey continues with its inclusion in instruments that form part of NASA's Mars Science Laboratory, launched in November 2011.



BAROCAP sensor



Cross-section of the BAROCAP sensor

## Indigo520 Transmitter For Vaisala Indigo-compatible probes



### Features

- Supports 2 detachable measurement devices simultaneously
- Data logging of all measurement parameters
- IP66 rated metal enclosure
- 4 configurable galvanically isolated analog outputs
- 2-wire current loop analog input
- 2 relays
- Ethernet connection with web interface and optional Vaisala cloud connectivity for remote monitoring
- Displays measurements on the spot and transmits them to automation systems through analog signals, relays, or Modbus TCP/IP protocol

Vaisala Indigo520 Transmitter is an industrial-grade, robust transmitter that accommodates 1 or 2 Vaisala Indigo-compatible probes for humidity, temperature, dew point, carbon dioxide, hydrogen peroxide, and moisture in oil measurements. The transmitter can measure barometric pressure with an additional module.

### Options

- Multiple powering options: Power over Ethernet, protective extra-low voltage, and AC (mains) power
- Available with Vaisala BAROCAP® barometric pressure sensor known for its high accuracy and excellent long-term stability
- Optional non-display model with LED indicator

### Variety of probe options

The Indigo500 series transmitters are the most versatile option for use with Indigo-compatible probes.

- HMP series humidity and temperature probes
- DMP series dew point probes
- GMP250 series carbon dioxide probes

- HPP270 series vaporized hydrogen peroxide probes
- MMP8 moisture in oil probe

The probes are interchangeable, self-contained measurement instruments that are easily detachable from the transmitter for calibration and maintenance. The probes are connected using a cable that can be extended with a standard instrumentation cable to allow up to 30 m (98 ft) distance between the transmitter and the probe.

The Indigo500 series transmitters can be connected to the MHT410 transmitter for display of measurement data and automation system connectivity. Through the transmitter service port, the Indigo500 series transmitters can also be connected to the free Vaisala Insight PC Software or Indigo80 Handheld Indicator.

The Indigo520 transmitter can be connected to Polaris™ PR53 Process Refractometers for measuring liquid concentrations.

For more information on the Indigo product family, see [vaisala.com/indigo](https://vaisala.com/indigo).

### Analog and digital interfaces

The Indigo520 transmitter has 4 analog channels that can be configured to mA or voltage type, and 2 configurable relays. Any of the output parameters from the connected probes can be assigned to control the analog channels and relays.

The digital output protocol is Modbus TCP/IP over Ethernet. The Ethernet connection also provides a web interface and cybersecurity that meets modern standards. The Indigo500 series transmitters can be ordered with a possibility for Vaisala cloud connection for remote monitoring.

# Technical data

## Indigo-compatible probes

Measurement type	Probe models
Humidity and temperature	HMP1, HMP3, HMP4, HMP5, HMP7, HMP8, HMP9
Temperature	TMP1
Dew point	DMP1, DMP5, DMP6, DMP7, DMP8
Carbon dioxide	GMP251, GMP252
Vaporized hydrogen peroxide	HPP271, HPP272
Moisture in oil	MMP8

## Other compatible devices

Device or series	Models
Moisture, Hydrogen and Temperature Transmitter MHT410	MHT410
Polaris™ Process Refractometers <sup>1)</sup>	PR53AC, PR53AP, PR53GC, PR53GP, PR53M, PR53SD, PR53W
Indigo80 Handheld Indicator	Indigo80
MGP241 Multigas Probe	MGP241
MGP260 Series Multigas Probes	MGP261, MGP262
Differential Pressure Transmitters <sup>2)</sup>	PDT101, PDT102

<sup>1)</sup> Compatible with transmitters ordered with software configuration "L" for process refractometers.  
<sup>2)</sup> PDT101 and PDT102 can be used through analog input.

## Transmitter options

Display	<ul style="list-style-type: none"> <li>Capacitive touchscreen display</li> <li>No display (indicator LED) <sup>1)</sup></li> </ul>
Powering	<ul style="list-style-type: none"> <li>Protective extra-low voltage (15–35 V DC, 24 V AC ± 20%)</li> <li>AC (mains) power (100–240 V AC 50/60 Hz)</li> <li>Power over Ethernet (no analog outputs, analog input, or relays)</li> </ul>

<sup>1)</sup> Recommended when the transmitter is exposed to direct UV light, and for outdoor installations and high-humidity environments.

## Measurement performance

Barometric pressure (optional module)	
Pressure range	500–1100 hPa
Class A:	
Linearity	±0.05 hPa
Hysteresis	±0.03 hPa
Repeatability	±0.03 hPa
Calibration uncertainty	±0.07 hPa
Accuracy at +20 °C / +68 °F	±0.10 hPa
Temperature dependence	±0.1 hPa
Total accuracy (-40 ... +60 °C / -40 ... +140 °F)	±0.15 hPa
Long-term stability/year	±0.1 hPa
Response time (100 % response):	
One sensor	2 s
Pressure units	hPa, mbar, kPa, Pa, inHg, mmH2O, mmHg, torr, psia

## Mechanical specifications

Housing classification	IK08, DIN EN ISO 11997-1: Cycle B (VDA 621-415)
Housing material	AlSi10Mg (DIN 1725)
Display window material	Strengthened glass (IK08)
Weight	1.5 kg (3.3 lb)
Dimensions (H × W × D)	142 × 182 × 67 mm (5.63 × 7.17 × 2.64 in)

### Cable diameters for cable glands

M20×1.5 glands	5.0–9.0 mm (0.20–0.35 in)
M20×1.5 glands with split bushing	7 mm (0.28 in)
M16×1.5 glands	2.0–6.0 mm (0.08–0.24 in)

## Operating environment

Operating environment	Outdoor use
Use in wet location	Yes
Operating humidity	0–100 %RH
Maximum operating altitude, AC (mains) power	3000 m (approx. 9800 ft)
Maximum operating altitude, protective extra-low voltage (PELV) and Power over Ethernet (PoE)	4000 m (approx. 13 100 ft)
IP rating	IP66 <sup>1)</sup>
UL 50E rating	Type 4

### Operating temperature

With display	-20 ... +55 °C (-4 ... +131 °F)
Without display	-40 ... +60 °C (-40 ... +140 °F)
Without display with barometer module	-40 ... +55 °C (-40 ... +131 °F)

### Storage temperature

With display	-30 ... +60 °C (-22 ... +140 °F)
Without display	-40 ... +60 °C (-40 ... +140 °F)

<sup>1)</sup> Evaluated by Eurofins, not by UL.

## Powering

### Operating power <sup>1)</sup>

Protective extra-low voltage (PELV) version 15–35 V DC, 24 V AC  $\pm 20\%$  50/60 Hz, max. current 2 A (power supply is galvanically isolated)

Fuse size for power supply: 3 A

Isolation voltage: 500 V AC, 1000 V DC

PELV power cable temp. rating  $\geq +80\text{ }^{\circ}\text{C}$  (+176  $^{\circ}\text{F}$ )

AC (mains) power version 100–240 V AC 50/60 Hz, max. current 1 A (power supply is galvanically isolated)

Fuse size for power supply: 10 A

Isolation voltage: 1500 V AC

AC (mains) power cable length 2.5 m (approx. 8 ft 2 in)

Power over Ethernet version Power over Ethernet (PoE) IEEE 802.3at Type 2 Class 4  
Max. current 600 mA, max. power consumption 25.5 W  
Isolation voltage: 500 V AC, 1000 V DC

### Typical current consumption at +20 °C (+68 °F) ( $U_{in}$ 24 V DC) <sup>2)</sup>

Base consumption (no display, analog outputs, or communication) 50 mA

With display + 60 mA

With voltage analog output < 2 mA per channel

With current analog output + 21 mA per channel

With relays + 9 mA per relay

With Ethernet cable connected + 15 mA

With barometer module + 5 mA

<sup>1)</sup> The power supply option is selected when ordering the transmitter.

<sup>2)</sup> For the current consumption of the connected measurement device, see the device's documentation, available at [docs.vaisala.com](https://docs.vaisala.com).

## User interfaces

User interfaces Web interface, optional touchscreen display, optional Vaisala cloud connectivity for remote monitoring <sup>1)</sup>

Supported languages English, Chinese (simplified), Chinese (traditional), French, German, Japanese, Spanish

Optional display 5" capacitive touchscreen

Integrated data logging capabilities Non-volatile memory, at least 10 years' storage with 24 h interval logging

## Inputs and outputs

Transmitter service port connection

- Connection to Insight software with USB2 and cable 262195SP or with cable 219690 <sup>1)</sup>
- Connection to Indigo80 with cable 262195SP

### Analog input <sup>2)</sup>

Available ranges 4–20 mA

Resolution 6  $\mu\text{A}$

Display resolution 0.01 mA

Accuracy  $\pm 0.05\text{ mA}$

Input impedances 200  $\Omega$

Isolation Isolated from power supply

Overload protection 40 mA max. (reverse polarity protected)

### Analog outputs <sup>2)</sup>

Number of analog outputs 4

Isolation Isolated from power supply

Selectable voltage output types 0–1 V, 0–5 V, 0–10 V, scalable

Selectable current output types 4–20 mA, 0–20 mA, scalable

Max. wire size 2.5 mm<sup>2</sup> (14 AWG)

Accuracy of analog outputs at +20 °C (+68 °F)  $\pm 0.05\%$  full scale

Temperature dependence  $\pm 0.005\%$  / °C full scale

External loads:

Current outputs  $R_L < 500\ \Omega$

0–1 V output  $R_L > 2\ \text{k}\Omega$

0–5 V and 0–10 V outputs  $R_L > 10\ \text{k}\Omega$

### Relay outputs <sup>2)</sup>

Number and type of relays 2 pcs, SPDT

Max. switching power, current, voltage 30 W, 1 A, 40 V DC / 28 V AC

Max. wire size in PELV version 2.5 mm<sup>2</sup> (14 AWG)

Max. wire size in AC (mains) version 1.5 mm<sup>2</sup> (16 AWG)

### Ethernet interface

Supported standards 10BASE-T, 100BASE-TX

Connector 8P8C (RJ45)

Supported protocols Modbus TCP/IP (port 502), HTTPS (port 8443)

Vaisala cloud connectivity <sup>3)</sup> Requires outbound TCP port 443 and UDP port 123

<sup>1)</sup> Vaisala Insight PC Software for Windows® available at [vaisala.com/insight](https://vaisala.com/insight).

<sup>2)</sup> Not available in transmitters that are powered with Power over Ethernet (PoE).

<sup>3)</sup> Available only for transmitters ordered with software configuration for Vaisala cloud connectivity.

## Compliance

EU directives and regulations EMC Directive (2014/30/EU)  
Low Voltage Directive (2014/35/EU)  
RoHS Directive (2011/65/EU) as amended by 2015/863

Electromagnetic compatibility (EMC) IEC/EN 61326-1, industrial environment  
CISPR 32 / EN 55032, Class B

Electrical safety IEC/EN 61010-1

Type approvals DNV GL certificate no. TAA000032M  
EU RO Mutual Recognition certificate no. MRA000004F

Compliance marks CE, China RoHS, FCC, RCM, UKCA

Listing marks UL Listed (USA and Canada)

FCC compliance FCC Part 15, Class B



## Spare parts

Cable gland, M20×1.5, 5.0–9.0 mm (0.20–0.35 in)	ASM213670SP
Cable gland, M20×1.5, 10.0–14.0 mm (0.39–0.55 in)	ASM215414
Cable gland with split bushing, M20×1.5 <sup>1)</sup>	262632SP
Cable gland, M16×1.5, 2.0–6.0 mm (0.08–0.24 in)	ASM213671SP
Conduit fitting, M20×1.5 for NPT1/2" conduit	214780SP
Sintered filter (for barometer module)	DRW010335SP

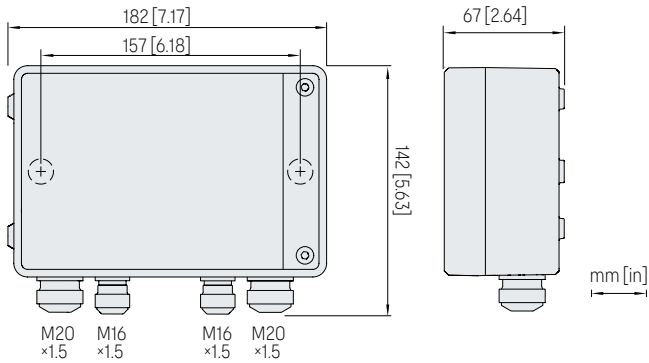
## Accessories

Retrofit mounting plate	DRW252186SP
Installation kit for pole or pipeline	215108
Installation kit with weather shield	215109
Indigo500 spatter guard	ASM214526
M12 - M8 service cable 1.5 m (4.9 ft), for connecting to Indigo80	262195SP
Vaisala Indigo USB adapter and M12 - M8 service cable, for connecting to Insight software	USB2 and 262195SP
M8 - USB service cable, for connecting to Insight software	219690

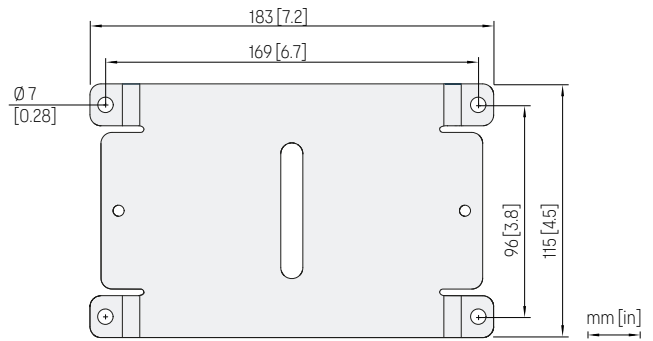
### Probe connection cables

Probe connection cable, 0.3 m (approx. 12 in), open end <sup>1)</sup>	CBL210896-03MSP
Probe connection cable, 1 m (approx. 3 ft 3 in), open end <sup>1)</sup>	CBL210896-1MSP
Probe connection cable, 3 m (approx. 9 ft 10 in), open end <sup>1)</sup>	CBL210896-3MSP
Probe connection cable, 5 m (approx. 16 ft 5 in), open end <sup>1)</sup>	CBL210896-5MSP
Probe connection cable, 10 m (approx. 32 ft 10 in), open end <sup>1)</sup>	CBL210896-10MSP

<sup>1)</sup> The usable length outside of the transmitter enclosure is approx. 0.1 m (4 in) shorter than the total length of the cable.



Indigo520 dimensions and lead-through sizes



Indigo500 retrofit mounting plate dimensions

## PTB330 Digital Barometer

For professional meteorology, aviation, and industrial users



### Features

- Vaisala BAROCAP sensor
- Accurate measurement
- Excellent long-term stability
- Added reliability through redundancy
- Graphical trend display with 1-year history data
- Height and altitude corrected pressure (QFE, QNH)
- For aviation, professional meteorology, laboratories, and demanding industrial applications
- Corrosion-resistant IP65/IP66 housing, suitable for outdoor and marine environment

Vaisala BAROCAP® Digital Barometer PTB330 is designed for a wide range of high-end atmospheric pressure measurements. The pressure measurement of PTB330 is based on the Vaisala silicon capacitive, absolute pressure sensor - the Vaisala BAROCAP sensor. It provides high measurement accuracy and excellent long-term stability.

### Highly accurate

The PTB330 series is highly accurate. Class A barometers for the most demanding applications are fine-tuned and calibrated against a high-precision pressure calibrator. Class B barometers are adjusted and calibrated using an electronic working standard. All PTB330 barometers come with a traceable factory calibration certificate.

### Reliability through redundancy

According to your choice, PTB330 can incorporate 1, 2, or 3 BAROCAP sensors. When 2 or 3 sensors are used, the barometer continuously compares the readings of the pressure sensors against one another and reports if they are within the set internal difference criteria. This unique feature provides redundancy in pressure measurement.

Users also get a stable and reliable pressure reading at all times, as well as a pre-indication of when to service or recalibrate the barometer.

### QNH and QFE

PTB330 can be set to compensate for the QNH and QFE pressure used especially in aviation. The QNH represents the pressure reduced to sea level, based on the altitude and temperature of the observation site. The QFE represents the height-corrected pressure of small differences in altitude, for example, the air pressure at the airfield elevation.

### Graphical display

PTB330 features a multilingual, graphical display allowing users to monitor measurement trends. PTB330 updates the graph automatically during measurement and it provides a 1-year measurement history. In addition to instant pressure, PTB330 provides the WMO pressure trend and tendency codes.

### Applications

PTB330 can be used successfully for aviation, professional meteorology, and for demanding industrial pressure measurement applications such as accurate laser interferometric measurement and exhaust gas analysis in engine test benches.

# Technical data

## Measurement performance

Property	Class A	Class B
<b>Barometric pressure range 500–1100 hPa</b>		
Linearity <sup>1)</sup>	±0.05 hPa	±0.10 hPa
Hysteresis <sup>1)</sup>	±0.03 hPa	±0.03 hPa
Repeatability <sup>1)</sup>	±0.03 hPa	±0.03 hPa
Calibration uncertainty <sup>2)</sup>	±0.07 hPa	±0.15 hPa
Accuracy at +20 °C (+68 °F) <sup>3)</sup>	±0.10 hPa	±0.20 hPa
<b>Barometric pressure range 50–1100 hPa</b>		
Linearity <sup>1)</sup>	–	±0.20 hPa
Hysteresis <sup>1)</sup>	–	±0.08 hPa
Repeatability <sup>1)</sup>	–	±0.08 hPa
Calibration uncertainty <sup>2)</sup>	–	±0.15 hPa
Accuracy at +20 °C (+68 °F) <sup>3)</sup>	–	±0.20 hPa
<b>Temperature dependence <sup>4)</sup></b>		
500–1100 hPa	±0.1 hPa	±0.1 hPa
50–1100 hPa	±0.3 hPa	±0.3 hPa
<b>Total accuracy –40 ... +60 °C (–40 ... +140 °F)</b>		
500–1100 hPa	±0.15 hPa	±0.25 hPa
50–1100 hPa	–	±0.45 hPa
<b>Long-term stability</b>		
500–1100 hPa	±0.1 hPa/year	±0.1 hPa/year
50–1100 hPa	±0.2 hPa/year	±0.2 hPa/year
<b>Miscellaneous</b>		
Pressure units	hPa, mbar, kPa, Pa inHg, mmH2O, mmHg, torr, psia	hPa, mbar, kPa, Pa inHg, mmH2O, mmHg, torr, psia
Resolution	0.01 hPa	0.1 hPa
Settling time at startup (1 sensor)	4 s	3 s
Response time (1 sensor)	2 s	1 s
Acceleration sensitivity	–	Negligible
Maximum pressure limit	–	5000 hPa absolute
Maximum measurement rate <sup>5)</sup>	–	10 Hz

- 1) Defined as ±2 standard deviation limits of endpoint non-linearity, hysteresis, or repeatability error.  
 2) Defined as ±2 standard deviation limits of inaccuracy of the working standard including traceability to international standards.  
 3) Defined as the root sum of the squares (RSS) of endpoint non-linearity, hysteresis error, repeatability error, and calibration uncertainty at room temperature.  
 4) Defined as ±2 standard deviation limits of temperature dependence over the operating temperature range.  
 5) For class A you need a longer averaging time or measurement interval.

## Operating environment

Operating pressure	500–1100 hPa, 50–1100 hPa
Operating temperature	PTB330 without display: –40 ... +60 °C (–40 ... +140 °F) PTB330 with display: +0 ... +60 °C (+32 ... +140 °F)
Operating humidity	0–100 %RH, non-condensing
Storage temperature	PTB330 without display: –55 ... +80 °C (–67 ... +176 °F) PTB330 with display: –40 ... +80 °C (–40 ... +176 °F)
IP rating	IP66 IP65 (NEMA 4) with local display <sup>1)</sup>

- 1) IP rating of PTB330AWS is IP40.

## Mechanical specifications

Pressure fitting	Barbed fitting for 1/8-inch (inside diameter) tubing or quick connector with shutoff valve for 1/8-inch hose
Pressure connector	M5 (10-32) internal thread
Housing material	G AISI10 Mg (DIN 1725)
Weight	1–1.5 kg (2.2–3.3 lb)

## Inputs and outputs

Supply voltage	10–35 V DC
Supply voltage sensitivity	Negligible
Typical power consumption at +20 °C (+68 °F) (voltage at 24 V DC with 1 pressure sensor)	RS-232: 25 mA RS-485: 40 mA
	Output voltage U <sub>out</sub> : 25 mA Output current I <sub>out</sub> : 40 mA Display and backlight: +20 mA
Serial communication	RS-232, RS-485, RS-422

## Analog output (optional)

Current output	0–20 mA, 4–20 mA	
Voltage output	0–1 V, 0–5 V, 0–10 V	
<b>Accuracy at pressure range</b>	500–1100 hPa	50–1100 hPa
At +20 °C (+68 °F)	±0.30 hPa	±0.40 hPa
At –40 ... +60 °C (–40 ... 140 °F)	±0.60 hPa	±0.75 hPa

## Data transfer software

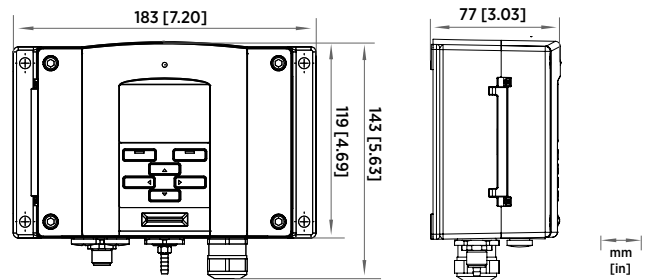
MI70 Link Interface software requirements	Microsoft® Windows OS Microsoft® Excel
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## Accessories

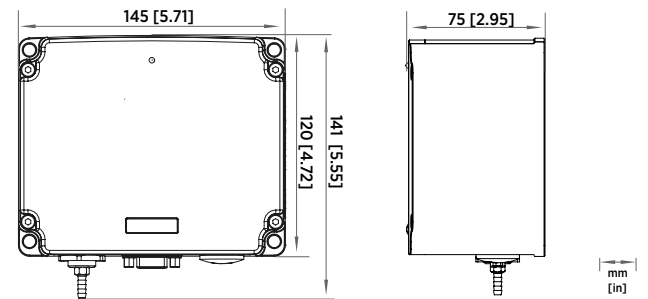
Modules	
Relay module	RELAY-1L
Temperature-compensated analog output module	AOUT-1T
Isolated RS-485 module	RS485-1
Power supply module	POWER-1
AC adapters for devices already equipped with an external AC adapter connector	
AC adapter, EU	MI70EUROADAPTER
AC adapter, USA	222340SP
AC adapter, UK	MI70UKADAPTER
AC adapter, AUS	MI70AUSADAPTER
Static pressure head	
Static pressure head	SPH10
Static pressure head with heating	SPH20
Barometer mounting accessories	
Junction box	ASM211113
Wall mounting kit	214829
Installation kit for pole or pipeline	215108
Outdoor installation kit (weather shield)	215109
DIN rail clips with installation plate	215094
Panel mounting frame	216038
Connection cables	
Connection cable for PTB330 and MI70 handheld meters for spot check or calibration and adjustment	211339
Service cables	
USB-RJ45 serial connection cable	219685
D9-RJ45 serial connection cable	215005
Output cables for 8-pin connector	
Connection cable 5 m with 8-pin M12 female, black	212142
Female connector 8-pin M12 with screw terminals	212416
Cable bushings	
PTB330/220/PTU200 DC adapter and RS-232 cable for PC	213019
PTB330/PTB220/PTU200 DC adapter cable	213026
Others	
Dust filter	237018SP
Barbed pressure fitting 1/8-inch	19498SP
Quick connector 1/8-inch	220186

## Compliance

Property	Value
EU directives and regulations	RoHS Directive (2011/65/EU) as amended by 2015/863 EMC Directive (2014/30/EU) Low Voltage Directive (2014/35/EU), applies to units equipped with single-phase AC power supply Power-1
Electrical safety	EN 61010-1:2010 + A1:2019, applies to units equipped with single-phase AC power supply Power-1
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment EN 55011:2009 + A1:2010
Environmental	EN IEC 63000:2018



PTB330 dimensions



PTB330AWS dimensions

## PTB330TS Barometric Pressure Transfer Standard

For portable use



### Features

- PTB330 digital barometer for accurate pressure measurement
- Handheld MI70 indicator with a user-friendly, multilingual display
- Service port for MI70 Link software or computer
- Vaisala HUMICAP® humidity and temperature probe HMP155
- Weatherproof transport case

Barometric Pressure Transfer Standard PTB330TS combines a PTB330 digital barometer with a handheld MI70 indicator into a portable unit that can be used as a transfer standard.

### Barometer for portable use

PTB330TS uses a PTB330 series digital barometer that is housed in a tabletop casing. PTB330TS is designed to be operated using the handheld MI70 indicator. The MI70 indicator also provides the operation power for the barometer. Optional HMP155 probe is available for accurate humidity and temperature measurement.

### For measurements in industrial and meteorological areas

PTB330TS is suitable for reference measurements in industrial and meteorological areas. PTB330TS is housed in a durable and weatherproof

transport case that can be easily carried and shipped. The components of the PTB330TS are placed in a foam interior with accessories and User Guide in the lid organizer. The case includes a shoulder strap.

### Available options

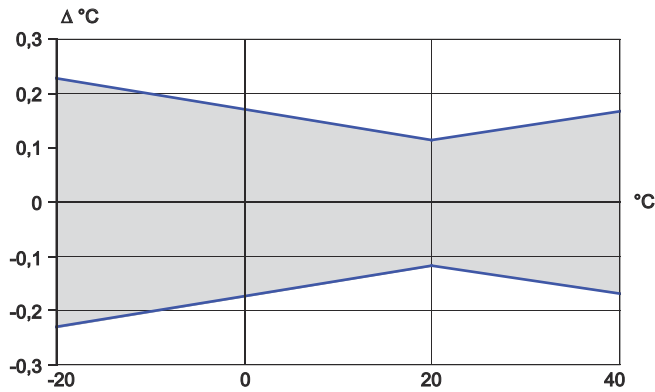
- ISO/IEC 17025 Accredited calibration for PTB330 and HMP155
- HMP155 options: additional temperature probe, manually controlled sensor purge feature
- MI70 Link software and USB or RS-232 cable for downloading measurement data to a computer
- USB service cable for connecting to PTB330 service port

# Technical data

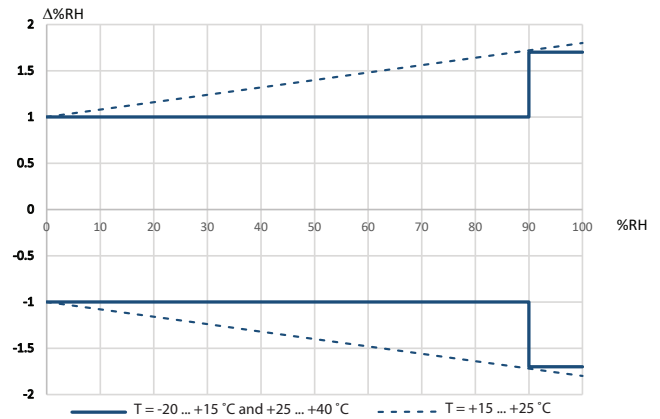
These specifications apply when MI70, PTB330, and HMP155 are used together in PTB330TS. For PTB330 and HMP155 specifications, see the product documentation.

## Operating environment

Operating temperature	
MI70	-10 ... +40 °C (+14 ... +104 °F)
PTB330	-40 ... +60 °C (-40 ... +140 °F)
HMP155	-80 ... +60 °C (-112 ... +140 °F)
Storage without display	-55 ... +80 °C (-67 ... +176 °F)
Storage with display	-40 ... +80 °C (-40 ... +176 °F)
Operating humidity	0-100 %RH, non-condensing
Maximum pressure limit	5000 hPa absolute
Power supply	Rechargeable NiMH battery pack with AC adapter or 4 x AA size alkalines, type IEC LR6
Menu languages	
	English, Chinese, French, Spanish, German, Russian, Japanese, Swedish, Finnish
Display	LCD with backlight, graphic trend display of any parameter, character height up to 16 mm
Data logging capacity	2700 points
Alarm	Audible alarm function
<b>Operation time (using rechargeable battery pack)</b>	
Continuous use with PTB330	11 h typical at +20 °C (+68 °F)
Data logging use	Up to 30 days



Accuracy of HMP155 temperature measurement over temperature range



Accuracy of HMP155 humidity measurement over temperature range

## Measurement performance

<b>Barometric pressure (PTB330)</b>	
Measurement range	500–1100 hPa
Linearity <sup>1)</sup>	±0.05 hPa
Hysteresis <sup>1)</sup>	±0.03 hPa
Repeatability <sup>1)</sup>	±0.03 hPa
Calibration uncertainty <sup>2)</sup>	±0.07 hPa
Accuracy at +20 °C (+68 °F) <sup>3)</sup>	±0.10 hPa
Temperature dependence <sup>4)</sup>	±0.1 hPa
<b>Total accuracy -40 ... +60 °C (-40 ... +140 °F)</b>	±0.15 hPa
Long-term stability	±0.1 hPa/year
Settling time at startup (1 sensor)	4 s
Response time (1 sensor)	2 s
Acceleration sensitivity	Negligible
<b>Relative humidity (HMP155)</b>	
Measurement range	0–100 %RH
<b>Accuracy (including non-linearity, hysteresis, and repeatability)</b>	
At +15 ... +25 °C (+59 ... +77 °F)	±1 %RH (0–90 %RH) ±1.7 %RH (90–100 %RH)
At -20 ... +40 °C (-4 ... +104 °F)	±(1.0 + 0.008 × reading) %RH
At -40 ... -20 °C (-40 ... -4 °F)	±(1.2 + 0.012 × reading) %RH
At +40 ... +60 °C (+104 ... +140 °F)	±(1.2 + 0.012 × reading) %RH
At -60 ... -40 °C (-76 ... -40 °F)	±(1.4 + 0.032 × reading) %RH
Factory calibration uncertainty at +20 °C (+68 °F) <sup>5)</sup>	±0.6 %RH (0–40 %RH) ±1.0 %RH (40–95 %RH)
Humidity sensor	HUMICAP®R2, 180R and INTERCAP for typical applications HUMICAP®R2C, 180RC and INTERCAPC for applications with chemical purge and/or warmed probe
Response time at +20 °C (+68 °F) in still air with sintered Teflon filter	63 %: 20 s 90 %: 60 s
<b>Temperature (HMP155)</b>	
Measurement range	-80 ... +60 °C (-112 ... +140 °F)
<b>Accuracy with RS-485 output</b>	
At -80 ... +20 °C (-112 ... +68 °F)	±(0.176 - 0.0028 × temperature) °C
At +20 ... +60 °C (+68 ... +140 °F)	±(0.07 + 0.0025 × temperature) °C
Sensor	Pt100 RTD element, Class F 0.1 IEC 60751
Response time with additional temperature probe in 3 m/s air flow	
63%	< 20 s
90%	< 35 s

- 1) Defined as ±2 standard deviation limits of endpoint non-linearity, hysteresis, or repeatability error.  
 2) Defined as ±2 standard deviation limits of inaccuracy of the working standard including traceability to NIST.  
 3) Defined as the root sum of the squares (RSS) of endpoint non-linearity, hysteresis error, repeatability error, and calibration uncertainty at room temperature.  
 4) Defined as ±2 standard deviation limits of temperature dependence over the operating temperature range.  
 5) Defined as ±2 standard deviation limits. Small variations possible (see also the calibration certificate).

## Available parameters

Pressure parameters	P, P3h, HCP, QFE, QNH
Humidity and temperature parameters	RH, T, T <sub>df</sub> , T <sub>d</sub> , x, T <sub>w</sub>

## Inputs and outputs

MI70 probe ports	2
MI70 data interface	RS-232 (accessible only with MI70 Link software)
PTB330 supply voltage	10–35 V DC (if not powered by MI70)
PTB330 data interface	RS-232C
PTB330 serial I/O connectors	RJ45 (service port) male 8-pin M12 (user port)
HMP155 data interface	RS-485
HMP155 serial I/O connector	Male 8-pin M12

## Mechanical specifications

<b>PTB330</b>	
Housing material	G-AlSi 10 mg (DIN 1725)
IP rating	IP65
Pressure connector	M5 (10-32) internal thread
Pressure fitting	Barbed fitting for 1/8 inch I.D. tubing or quick connector with shutoff valve for 1/8 inch hose
<b>HMP155</b>	
Housing material	Polycarbonate, PC
IP rating	IP66
Additional T-probe cable length	2 m (6 ft 6 in)
Cable material	PUR
Sensor protection	Sintered polytetrafluoroethylene, PTFE
<b>MI70 measurement indicator</b>	
IP rating	IP54
Housing material	Acrylonitrile butadiene styrene / polycarbonate (ABS/PC) blend
<b>Transport case</b>	
IP rating (when closed)	IP67
Plastic parts	TTX01®, PP+SEBS, POM
Metal parts	Stainless steel AISI303
Interior foam material	Polyethylene and polyether
Weight with all instruments and typical accessories	5.9 kg (13 lb)
Exterior dimensions (L × W × H)	405 × 330 × 165 mm (15.94 × 12.99 × 6.50 in)

## Compliance

Property	Value
EU directives and regulations	RoHS Directive (2011/65/EU) as amended by 2015/863 EMC Directive (2014/30/EU) Low Voltage Directive (2014/35/EU), applies to units equipped with single-phase AC power supply Power-1
Electrical safety	EN 61010-1:2010 + A1:2019, applies to units equipped with single-phase AC power supply Power-1
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment EN 55011:2009 + A1:2010
Environmental	EN IEC 63000:2018

## Spare parts and accessories

### PTB330

MI70 - PTB330 spiral cable	223235SP
USB-RJ45 serial connection cable	219685
D9-RJ45 serial connection cable	215005
Barbed fitting 1/8 in	19498SP
Quick connector 1/8 in	220186
Transport case with interior foams and tabletop casing for PTB330	224068SP

### MI70

USB cable for MI70, includes MI70 Link software	219687
MI70 Link software	MI70LINK
MI70 connection cable to HMT330, MMT330, DMT340, HMT100, PTB330	211339
MI70 battery pack variety of AC adapters available	26755

### AC adapters for devices already equipped with an external AC adapter connector

AC adapter, EU	MI70EUROADAPTER
AC adapter, USA	MI70USADAPTER
AC adapter, UK	MI70UKADAPTER
AC adapter, AUS	MI70AUSADAPTER
All AC adapter	MI70ALLADAPTER

### HMP155

HMP155 - MI70 connection cable	221801
Protection set for HMP155 calibration buttons: protective cover, 2 O-rings and protective plug	221318
USB cable for HMP155	221040
Sintered Teflon filter + O-ring	219452SP
Humidity calibrator	HMK15
HMK15 adapter fitting for 12-mm probes	218377SP





### Features

- 500 ... 1100 hPa or 50 ... 1100 hPa pressure ranges with serial output
- Different scalings between 500 ... 1100 hPa with analog output
- Electronics housing IP65 protected against sprayed water
- Accurate and stable measurement
- Traceable calibration (certificate included)

Vaisala BAROCAP® Digital Barometer PTB210 is a reliable outdoor barometer for harsh conditions.

### For harsh environments

PTB210 is ideal for outdoor installations and harsh environments. PTB210 is designed to operate in a wide temperature range, and the electronics housing provides IP65 (NEMA 4) standardized protection against sprayed water.

PTB210 is ideal for use in applications such as weather stations, data buoys, ships, airports, and agrology. It is also an excellent solution for monitoring barometric pressure in industrial equipment such as laser interferometers and engine test benches.

### Several pressure ranges

PTB210 is designed for various pressure ranges. It is available in 2 pressure ranges in 3 configurations:

- Serial output for 500 ... 1100 hPa
- Serial output for 50 ... 1100 hPa
- Analog output with different scalings between 500 ... 1100 hPa

### Accurate and stable measurement

PTB210 is digitally adjusted and calibrated by using electronic working standards. A higher accuracy barometer, which is fine-tuned and calibrated against a high-precision pressure calibrator, is available for the 500 ... 1100 hPa pressure range.

In addition, PTB210 integrates directly with Vaisala Static Pressure Head Series SPH10/20. This pairing offers accurate measurement in all wind conditions.

### Vaisala BAROCAP technology

PTB210 uses the Vaisala BAROCAP sensor, a silicon capacitive absolute pressure sensor developed by Vaisala for barometric pressure applications. The Vaisala BAROCAP sensor provides excellent hysteresis and repeatability

characteristics and outstanding temperature and long-term stability. PTB210 is delivered with a traceable factory calibration certificate.



PTB210 paired with SPH10 static pressure head

# Technical Data

## Measurement performance

Pressure range	
Serial output	500 ... 1100 hPa 50 ... 1100 hPa
Analog output	500 ... 1100 hPa 600 ... 1060 hPa 800 ... 1060 hPa 900 ... 1100 hPa

Serial output, accuracy (hPa)			
Pressure range	500 ... 1100		50 ... 1100
	Class A	Class B	
Non-linearity <sup>1)</sup>	± 0.10	± 0.15	± 0.20
Hysteresis <sup>1)</sup>	± 0.05	± 0.05	± 0.10
Repeatability <sup>1)</sup>	± 0.05	± 0.05	± 0.10
Calibration uncertainty <sup>2)</sup>	± 0.07	± 0.15	± 0.20
Accuracy at +20 °C (+68 °F) <sup>3)</sup>	± 0.15	± 0.20	± 0.35
Temperature dependency <sup>4)</sup>	± 0.20	± 0.20	± 0.40
Total accuracy -40 ... +60 °C (-40 ... +140 °F) <sup>3)</sup>	± 0.25	± 0.30	± 0.50
Long-term stability (hPa/year)	± 0.10	± 0.10	± 0.20

Analog output, accuracy	
Non-linearity <sup>1)</sup>	± 0.20 hPa
Hysteresis <sup>1)</sup>	± 0.05 hPa
Repeatability <sup>1)</sup>	± 0.05 hPa
Calibration uncertainty <sup>2)</sup>	± 0.15 hPa
Accuracy at +20 °C (+68 °F) <sup>3)</sup>	± 0.30 hPa
Temperature dependency <sup>4)</sup>	± 0.50 hPa
Total accuracy -40 ... +60 °C (-40 ... +140 °F) <sup>3)</sup>	± 0.60 hPa
Long-term stability	± 0.10 hPa/year

- 1) Defined as the ±2 standard deviation limits of end point non-linearity, hysteresis error, or repeatability error.
- 2) Defined as ±2 standard deviation limits of inaccuracy of the working standard including traceability to international standards.
- 3) Defined as the root sum of the squares (RSS) of end point non-linearity, hysteresis error, repeatability error, and calibration uncertainty at room temperature.
- 4) Defined as ±2 standard deviation limits of temperature dependence over the operating temperature range.

## Operating environment

Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Operating humidity	0-100 %RH, non-condensing

## Compliance

Directives	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU)
Electromagnetic compatibility (EMC)	EN / IEC 61326-1, Electrical equipment for measurement, control and laboratory use - EMC requirement; Basic environment CISPR 32 / EN 55032, Class B
Compliance	CE, FCC, UKCA

## Mechanical specifications

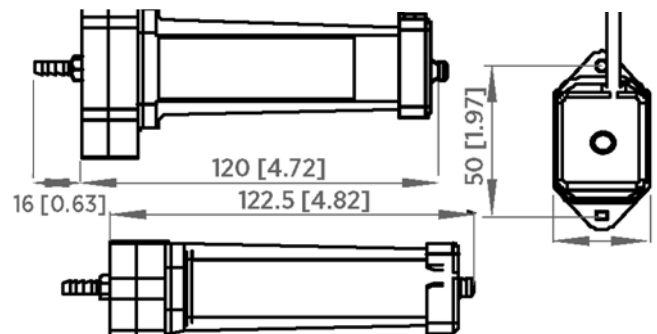
Housing material	PC plastic
IP rating, electronics	IP65 (NEMA 4)
IP rating, sensor	IP53
Weight, sensor	110 g (3.9 oz)
Cable weight	28 g/m (1.0 oz)

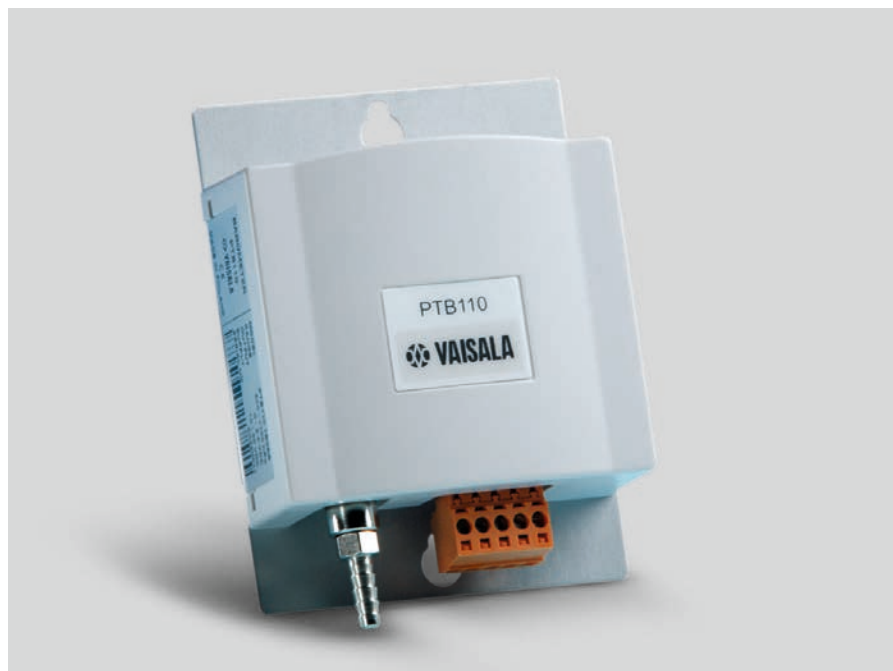
## Inputs and outputs

Serial output	
Shutdown	ON/OFF
Settling time at startup	2 s
Serial I/O	RS-232C RS-232C / TTL (optional) RS-485, non-isolated (optional)
Parity	None, even, odd
Data bits	7, 8
Stop bits	1, 2
Baud rate	1200, 2400, 4800, 9600, 19200
Response time	1 s
Resolution	0.01 hPa (1 measurement/s) 0.03 hPa (10 measurements/s)
Current consumption, normal mode	< 15 mA (factory setting)
Current consumption, shutdown mode	0.2 mA

Analog output	
Outputs	0 ... 5 V DC, 0 ... 2.5 V DC (order specified)
Shutdown	ON/OFF
Response time	500 ms
Resolution	300 µV
Measurement rate	3 measurements/s
Current consumption, normal mode	< 8 mA
Current consumption, shutdown mode	0.2 mA

All models	
Max. pressure	5 000 hPa absolute
Pressure connector	M5 (10-32) internal thread
Pressure fitting	Barbed fitting for 1/8 in I.D. tubing
Supply voltage (reverse polarity protected), with RS-232/TTL output	5 ... 28 V DC
Supply voltage (reverse polarity protected), with RS-485 or analog output	8 ... 18 V DC





### Features

- Vaisala BAROCAP® sensor
- Several pressure ranges
- Accuracy  $\pm 0.3$  hPa at  $+20$  °C
- Long-term stability
- On/Off control with external trigger
- Output voltage 0 ... 2.5 or 0 ... 5 VDC
- Current consumption less than 4 mA
- Mountable on 35 mm wide DIN rail
- Traceable calibration (certificate included)

Vaisala BAROCAP® Barometer PTB110 is designed both for accurate barometric pressure measurements at room temperature and for general environmental pressure monitoring over a wide temperature range.

### Vaisala BAROCAP Technology

PTB110 uses the Vaisala BAROCAP sensor, a silicon capacitive absolute pressure sensor developed by Vaisala for barometric pressure measurement applications. The sensor combines the outstanding elasticity characteristics and mechanical stability of single-crystal silicon with the proven capacitive detection principle.

### Applications

PTB110 is suitable for a variety of applications, such as environmental pressure monitoring, data buoys, laser interferometers, and agriculture and hydrology. The compact PTB110 is ideal for data logger applications as it has low power consumption. The external On/Off control is practical when electricity supply is limited.

### Accuracy and Stability

The excellent long-term stability of the barometer minimizes or even removes the need for field adjustment in many applications.

# Technical Data

## Measurement performance

Pressure range (1 hPa= 1 mbar)	500 ... 1100 hPa
	600 ... 1100 hPa
	800 ... 1100 hPa
	800 ... 1060 hPa
	600 ... 1060 hPa
Resolution	0.1 hPa
Load resistance	10 000 Ω minimum
Load capacitance	47 nF maximum
Settling time to full accuracy after startup	1 s
Response time to full accuracy after a pressure step	500 ms
Acceleration sensitivity	Negligible
<b>Accuracy</b>	
Linearity <sup>1)</sup>	±0.25 hPa
Hysteresis <sup>1)</sup>	±0.03 hPa
Repeatability <sup>1)</sup>	±0.03 hPa
Pressure calibration uncertainty <sup>2)</sup>	±0.15 hPa
Voltage calibration uncertainty	±0.7 mV
Frequency calibration uncertainty	±0.3 Hz
Accuracy at +20 °C (+68 °F) <sup>3)</sup>	±0.3 hPa
<b>Total accuracy at</b>	
+15 ... +25 °C (+59 ... +77 °F)	±0.3 hPa
0 ... +40 °C (+32 ... +104 °F)	±0.6 hPa
-20 ... +45 °C (-4 ... +113 °F)	±1.0 hPa
-40 ... +60 °C (-40 ... +140 °F)	±1.5 hPa
Long-term stability	±0.1 hPa / year

1) Defined as ±2 standard deviation limits of end-point non-linearity, hysteresis error, or repeatability error.

2) Defined as ±2 standard deviation limits of inaccuracy of the working standard including traceability to international standards.

3) Defined as the root sum of the squares (RSS) of end-point non-linearity, hysteresis error, repeatability error, and calibration uncertainty at room temperature.

## Operating environment

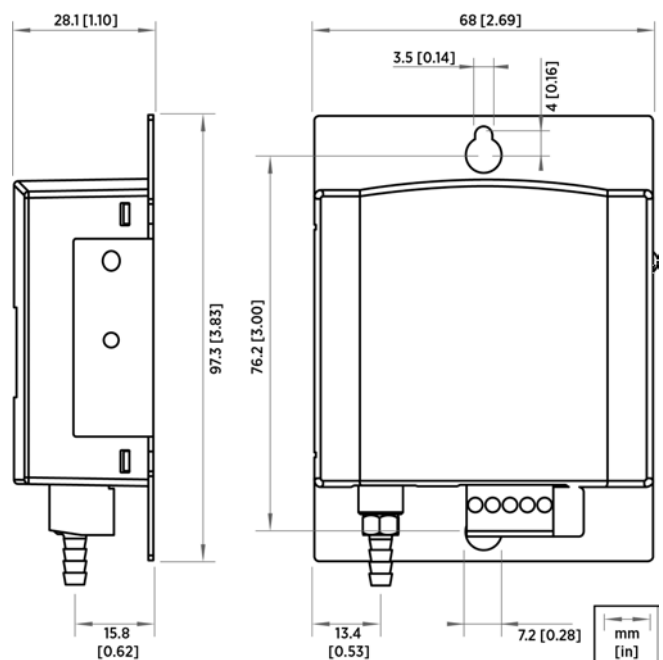
Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-40 ... +60 °C (-40 ... +140 °F)
Operating humidity	Non-condensing
IP rating	IP32
Electromagnetic compatibility (EMC)	EN 61326-1, industrial environment

## Mechanical specifications

Dimensions (H × W × D)	97.3 × 68.4 × 28.1 mm (3.83 × 2.69 × 1.10 in)
Weight	90 g (3.2 oz)
<b>Materials</b>	
Housing cover	Plastic ABS/PC blend
Mounting plate	Aluminum

## Inputs and outputs

Supply voltage	10 ... 30 V DC
Supply voltage control	With TTL-level (Transistor-Transistor-Logic) trigger
Supply voltage sensitivity	Negligible
Average power consumption	0.10 W at 12 V
Output voltage	0 ... 2.5 V DC 0 ... 5 V DC
Output frequency	500 ... 1100 Hz
Pressure connector	M5 (10 ... 32) internal thread
Pressure fitting	Barbed fitting for 1/8 in
Minimum pressure limit	0 hPa abs
Maximum pressure limit	2000 hPa abs
Electrical connector	A removable connector for 5 wires (AWG 28 ... 16)
Terminals	Pin 1: External triggering Pin 2: Signal ground Pin 3: Supply ground Pin 4: Supply voltage Pin 5: Voltage/Frequency output



Dimensions



## SPH10/20 Static Pressure Heads

For minimizing wind induced error



SPH10/20 is easy to install and connect. In the picture, SPH10 is connected to PTB210.

### Features

- Minimizes wind induced error
- Reliable barometric pressure measurement in all weather
- Wind tunnel tested structure
- Easy to clean
- Easy to install

SPH10/20 Static Pressure Heads Series products minimize the effects of wind on barometric pressure readings.

Wind induced effects are one of the main sources of error when measuring barometric pressure. Variations due to strong and gusty wind can be overcome by using a static pressure head to reduce the effect of dynamic pressure.

Vaisala Static Pressure Head Series SPH10/20 are designed to minimize the errors caused by wind. Their wind tunnel tested structure is both horizontally and vertically symmetrical. This design ensures reliable barometric pressure measurements in all weather.

### Ideal for outdoor installations

Vaisala static pressure heads are available in 2 models: Vaisala Static Pressure Head SPH10 is a basic version, and Vaisala Static Pressure Head SPH20 is a heated version for reliable operation in snowy and icy conditions. SPH20 is available in 2 voltage variants: 12 V DC (SPH20) and 24 V DC (SPH20-24V). The heated SPH20 contains a thermostat that switches on the heating power at temperatures where the risk of icing may occur.

Composed of ultraviolet stabilized polycarbonate (PC) plastics and offshore aluminum, SPH10/20 static pressure heads are durable and weather resistant.

SPH10/20 protects against rain and condensed water. This prevents capillary condensation of a water column in the pressure channel resulting in a pressure error. The drain holes in the lower plate allow rain and water to flow out. The static pressure heads have internal netting that prevents insects and debris from blocking the pressure channel.

### Carefree maintenance

SPH10/20 static pressure heads are easy to install and disassemble, service, and clean – even at the installation site. Vaisala BAROCAP® Digital Barometer PTB210 can be installed directly on top of SPH10/20 static pressure heads. Other barometers can be connected to the heads with pressure tubing.

SPH10 and SPH20 are a perfect pair for all Vaisala barometers. They ensure an accurate and reliable measurement in all weather conditions.

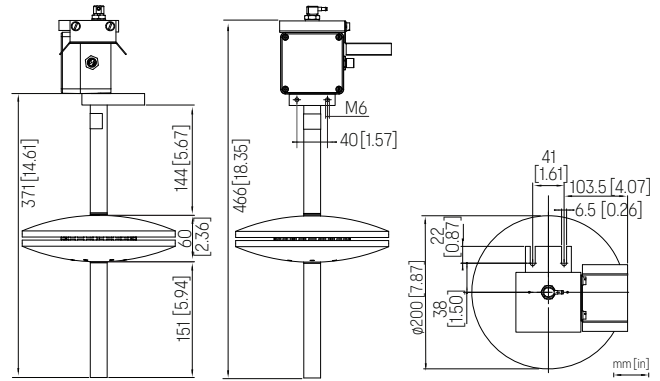
# Technical data

## Operating environment

Operating temperature -60 ... +80 °C (-76 ... +176 °F)

## Mechanical specifications

Weight	SPH10: 800 g (1.76 lb) SPH20, SPH20-24V: 1360 g (3.0 lb)
Materials	Polycarbonate (PC) plastic, offshore aluminum
Mounting	M6×30 DIN912 (2 pcs), M6x20 DIN912 (2 pcs), M6 spring lock washer DIN127 (2 pcs) M6 flat washer DIN125 (2 pcs)
Hose connection	Barbed fitting for 4 mm I.D. hose or Rp1/4 thread (parallel)



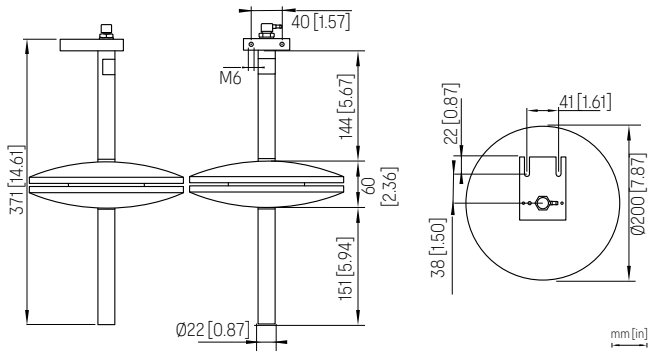
SPH20 and SPH20-24V

## Inputs and outputs

Electrical connections	M12 connector
Power supply	SPH20: 12 V / 70 W SPH20-24V: 24 V / 35 W

### Thermostat switching temperature

On	+4 °C ±3 °C (+39.2 °F ±4.4 °F)
Off	+13 °C ±3 °C (+55.4 °F ±4.4 °F)



SPH10



### Features

- Easy mounting on wall, DIN rail, or panel
- 3 pressure ranges (Pa and inH<sub>2</sub>O)
- Unidirectional and bidirectional models
- Accessible zero and span adjustment potentiometers
- LED status indicator
- Dedicated models for critical and regulated environments and for air handling systems
- Euro style detachable connector
- Calibrations traceable to SI units through national metrology institutes or accredited calibration laboratories

Vaisala Differential Pressure Transmitter PDT101 offers precise measurement of differential air pressure. PDT101 offers dedicated models for critical and regulated environments with very low differential pressures and unidirectional models for air handling systems.

### Operating environment

The highly accurate bidirectional models of PDT101 are designed especially for demanding life science and cleanroom applications, and are the perfect choice for any application requiring precise pressure differential measurement. The transmitter is ideal for incorporating into the Vaisala viewLinc Continuous Monitoring System to measure and monitor the critical environmental parameters as required in regulated environments.

The unidirectional models of PDT101 are optimal for air handling units to measure differential pressure over fans or filters, for example.

Zero and span adjustment screws are available on every PDT101 model. Both adjustments are accessible from the front of the unit.

### Performance

PDT101 offers high accuracy, sensitivity, and stability, with models providing accuracies of either 0.40 or 1 % of span. The sensor uses a micro-machined, ultra-thin silicon diaphragm which provides inherent sensor repeatability and stability. The sensor enables precise measurement and control in high performance environments. The PDT101 transmitter is available with voltage output (3-wire) or current output (2-wire).

### Applications

PDT101 is suitable for high performance environments in the life science, semiconductor, and electronics industries, as well as in building automation systems in data centers and other demanding buildings and environments.

When used in regulated environments as part of the viewLinc system, it is highly suitable for fulfilling the requirements of continuous, documented, and redundant data, to meet FDA, EMA and other international regulations.

The compact design is well suited for mounting in a cleanroom or in the adjacent corridor with LED indicator lights for quick and easy power status spot check.

# Technical data

## Models

Model	Measurement range	Output
PDT101-P4C	±60 Pa	4–20 mA
PDT101-P4V	±60 Pa	0–5 V
PDT101-P4C2	±125 Pa	4–20 mA
PDT101-P4V2	±125 Pa	0–5 V
PDT101-W4C	±0.25 inH <sub>2</sub> O	4–20 mA
PDT101-W4V	±0.25 inH <sub>2</sub> O	0–5 V
PDT101-W4C2	±0.5 inH <sub>2</sub> O	4–20 mA
PDT101-W4V2	±0.5 inH <sub>2</sub> O	0–5 V
PDT101-P10C	0–500 Pa	4–20 mA
PDT101-P10V	0–500 Pa	0–10 V
PDT101-W10C	0–2 inH <sub>2</sub> O	4–20 mA
PDT101-W10V	0–2 inH <sub>2</sub> O	0–10 V
PDT101-P10Cx <sup>1)</sup>	0–500 Pa	4–20 mA
PDT101-P10Vx <sup>1)</sup>	0–500 Pa	0–10 V
PDT101-W10Cx <sup>1)</sup>	0–2 inH <sub>2</sub> O	4–20 mA
PDT101-W10Vx <sup>1)</sup>	0–2 inH <sub>2</sub> O	0–10 V

<sup>1)</sup> The PDT101-P10Cx, PDT101-P10Vx, PDT101-W10Cx, and PDT101-W10Vx models do not include calibration certificate.

## Measurement performance

Measurement ranges (bidirectional)	±60 Pa, ±125 Pa, ±0.25 inH <sub>2</sub> O, or ±0.5 inH <sub>2</sub> O
Measurement ranges (unidirectional)	0–500 Pa, or 0–2 inH <sub>2</sub> O
Accuracy (incl. non-linearity, hysteresis, repeatability and zero/span calibration settings)	0.4 % of span (bidirectional models), 1% of span (unidirectional models)
Long-term stability	≤ 0.5 % span/year
Response time (10–90 %)	250 ms
Warm-up time	15 s
Compensated temperature range	+2 ... +54 °C (+35.6 ... +129.2 °F)
Temperature dependence	±(0.065 Pa + 0.054 % of reading) / °C or ±(0.00015 inH <sub>2</sub> O + 0.03 % of reading) / °F (reference 21 °C or 70 °F)
Pressure type	Differential, gauge, vacuum and compound
<b>Overpressure</b>	
Proof pressure	1.0 bar
Burst pressure	1.7 bar
Static pressure	1.7 bar
<b>Mounting position</b>	
Error (zero adjustable)	≤ 1 %/g (calibration in vertical position is standard)
<b>Adjustments (front accessible)</b>	
Zero	±5 % span
Span	±3 % span

## Compliance

EU directives and regulations	EMC
Electromagnetic compatibility (EMC)	EN 61326-1, basic immunity test requirements
Compliance marks	CE, RCM

## Mechanical specifications

Medium (measured gas)	Clean and dry air, non-conducting and non-corrosive gases
Mounting	Threaded fastener for wall mounting or DIN rail type EN 50022
IP rating	IP40
Weight	0.07 kg
<b>Material</b>	
Process connection	Brass
Sensor element	Silicon, aluminum, glass
Case	NEMA type 1 fire-retardant ABS 1 (meets UL94-5VA)

## Inputs and outputs

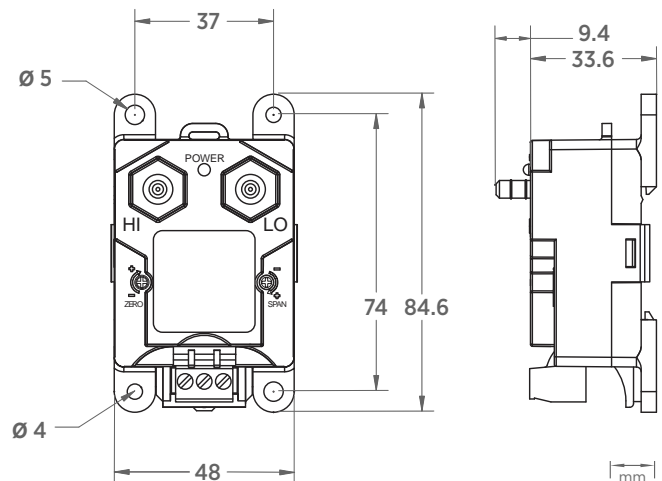
Process connection	1/4" barbed fittings
Tubing outer and inner dimensions	Outer dimension (O.D.): 1/4" (6.35 mm) Inner dimension (I.D.): 1/8" (3.17 mm)
Max. loop resistance for 4 ... 20 mA	≤ (Supply voltage - 12 V) / 0.022 A
Supply current	Max. 20 mA for 4–20 mA output signal
Optical process diagnostics	LED visual indicator
Electrical connection	Euro style pluggable terminal block accepts 12–26 AWG wire (0.13 up to 3.31 mm <sup>2</sup> )

Output signal	
2-wire	4–20 mA
3-wire	0–5 or 0–10 V DC (user selectable)
Operating voltage	
2-wire output 4–20 mA	12 ... 36 V DC
3-wire output 0–5 V DC	11.5–36 V DC or 24 V AC
3-wire output 0–10 V DC	14–36 V DC or 24 V AC

## Operating environment

Operating temperature	–18 ... +70 °C (–0.4 ... +158 °F)
Storage temperature	–40 ... +82 °C (–40 ... +179.6 °F)

Note: If used in an electromagnetic field of 3 V/m, with narrow frequency area of 80 ... 120 MHz, it is possible that the current output of PDT101 can deviate max. 0.8 % (with accuracy specified 0.4 %)



PDT101 dimensions



### Features

- In-place system calibration and online monitoring without disturbing process tubes with optional process valve actuator and test jacks
- Ultrathin profile ideally suited for DIN rail mount reduces installation and calibration costs
- High accuracy, two options; 0.25 % or 0.50 % of span
- Extremely robust MEMS silicon sensor technology provides very high accuracy, sensitivity, stability, and durability
- Calibrations traceable to SI units through national metrology institutes or accredited calibration laboratories
- Front side accessible zero and span adjustment potentiometers

Vaisala Differential Pressure Transmitter PDT102 offers ultra low pressure measurement for cleanroom control and monitoring applications.

### Operating environment

Vaisala Differential Pressure Transmitter PDT102 is a high performance instrument designed primarily for life science and high technology cleanroom applications. The front panel includes zero and span adjustment potentiometers for convenient adjustment. The PDT102 transmitter is ideal for incorporating into the Vaisala viewLinc Continuous Monitoring System to measure and monitor the critical environmental parameters as required in regulated environments.

### Performance

PDT102 offers very high accuracy, sensitivity and stability with two options for accuracy, 0.25% or 0.50% of span providing a highly reliable and

repeatable measurement. The sensor uses a micro-machined, ultra-thin silicon diaphragm which provides inherent sensor repeatability and stability. The sensor enables precise measurement and control in high performance cleanrooms. The PDT102 transmitter is available with voltage output (3-wire) or current output (2-wire).

### Available options

Online monitoring of PDT102 is simple using the optional process valve actuator and the front access test jacks. The front access test jacks provide online process reference signal or calibration signal without disconnecting power supply wiring. Measurements can be made using a standard multimeter.

### Applications

PDT102 is designed for use in critical monitoring of cleanrooms for pharmaceutical, biotechnology, medical device, and semiconductor controlled manufacturing environments.

# Technical data

## Measurement performance

Measurement ranges (bidirectional)	±50 Pa ±0.25 in H <sub>2</sub> O
Accuracy <sup>1)</sup>	0.25 % span or 0.5 % span, depending on choice
Repeatability for 0.25 % span accuracy	0.03 %
Repeatability for 0.5 % span accuracy	0.05 %
Electrical resolution	1 x 10 <sup>-4</sup> span
Long-term stability	≤0.5 % span/year
Response time (10– 90 %)	250 ms
Warm-up time	15 s
Compensated temperature range	+2 ... +57 °C (+35.6 ... +134.6 °F)
Temperature dependence	±(0.036 Pa + 0.036 % of reading) / °C or ±(0.0001 in H <sub>2</sub> O + 0.02 % of reading) / °F (reference 21 °C or 70 °F)
Pressure type	Differential, gauge, vacuum and compound
<b>Overpressure</b>	
Proof pressure	0.7 bar
Burst pressure	1.7 bar
Static pressure	1.7 bar
<b>Mounting position</b>	
Error (zero adjustable)	≤0.25 %
<b>Adjustments (front accessible)</b>	
Zero	±5 % span
Span	±3 % span

<sup>1)</sup> Incl. non-linearity, hysteresis, repeatability and zero/span calibration settings.

## Inputs and outputs

Process connection	1/8 NPT female according to ANSI/ ASME B1.20.1
Tubing dimensions	Outer dimension (O.D.): 1/8" (3.17 mm)
Operating voltage	12–36 V DC
Max. loop resistance for 4–20 mA	≤ (Supply voltage - 12V)/0.022 A
Electrical connection	Screw terminals, 12– 22 AWG (0.33 up to 3.31 mm <sup>2</sup> )
<b>Output signal</b>	
2-wire	4–20 mA
3-wire	0–5 V
<b>Supply current</b>	
For 0–5 V output	Max. 10 mA
For 4–20 mA output	Max. 20 mA

## Mechanical specifications

Medium (measured gas)	Clean and dry air, non-conducting and non-corrosive gases
Mounting	DIN rail types EN 50022, EN 50035 and EN 50045
Weight	0.16 kg
<b>Material</b>	
Process connection	Brass
Sensor element	Silicon, aluminum, glass
Case	Polycarbonate, glass filled (UL94-V-1)

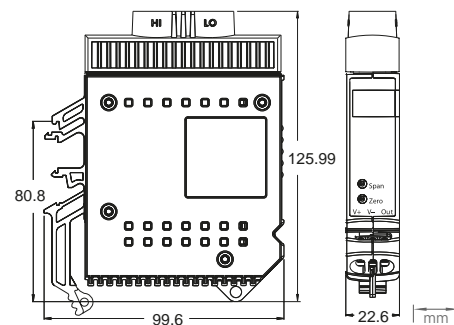
## Operating environment

Operating temperature	–29 ... +70 °C (–20.2 ... +158 °F)
Storage temperature	–40 ... +82 °C (–40 ... +179.6 °F)
IP rating	IP30

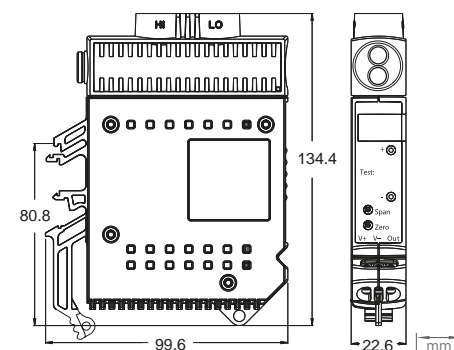
Note: If used in an electromagnetic field of 3 V/m, with narrow frequency area of 80 - 120 MHz, it is possible that the current output of PDT102 can deviate max. 0.3 % (with accuracy specified 0.25 %)

## Compliance

EU directives and regulations	EMC
Electromagnetic compatibility (EMC)	EN 61326-1, basic immunity test requirements
Compliance marks	CE, RCM



PDT102 transmitter dimensions



PDT102 dimensions with process valve actuator and test jacks

## PDT102 - XXXT

Measurement range:  
**P** (+/-50 Pa) or **W** (+/-0.25 in H<sub>2</sub>O) ———— ↑ ↑ ↑  
 Accuracy: **2** (0.25 % span) or **5** (0.5 % span) ———— ↑  
 Output: **C** (current) or **V** (voltage) ———— ↑  
 Option: (blank) or **T** ———— ↑

Order information for PDT102