PTU300 Combined Pressure, Humidity, and Temperature Transmitter

For Demanding Applications

Features

- Barometric pressure, humidity, and temperature measurement in one transmitter
- RS-232C serial interface with NMEA protocol for GPS use
- Graphical display and keypad for convenient operation
- Analog outputs, RS-232/485, LAN
- Modbus protocol support (RTU/TCP)
- Traceable to international standards

Vaisala Combined Pressure, Humidity and Temperature Transmitter PTU300 is a unique instrument measuring three parameters simultaneously.

Options

- Available with up to two barometric pressure sensors for added reliability
- Optional universal power supply module
- HMT330MIK installation kit for outdoor use

You can choose from the following probe options: PTU301 for wall mounting for example in laboratories or engine rooms, PTU303 for general use, PTU307 warmed probe for outdoor and demanding meteorology applications, and PTU30T for pressure and temperature measurement only.

Proven Vaisala Sensor Technology

PTU300 incorporates sensors known for their high accuracy and excellent long-term stability: Vaisala BAROCAP® for pressure measurement and Vaisala HUMICAP® for humidity measurement. The temperature sensor is a platinum RTD sensor.

Graphical Display of Measurement Data and Trends for Convenient Operation

PTU300 features a large numerical and graphical display with a multilingual menu and keypad. It allows users to easily monitor operational data, measurement trends, and access measurement history for the past 12 months.

The optional data logger, with real-time clock, makes it possible to generate over four years of measurement history and zoom in on any desired time or time frame.

The display alarm allows any measured parameter to be tracked, with freely configurable low and high limits.

Versatile Outputs and Data Collection

PTU300 comes with a standard RS-232 serial interface. The output format is compatible with major GPS receivers and NMEA-coded messages. An isolated RS-485 interface is available as an option.

PTU300 is also capable of applying the Modbus communication protocol and, together with an appropriate connection option, provides either Modbus RTU (RS-485) or Modbus TCP/IP (Ethernet) communication.

The data logger records data that can be viewed on the local display or transferred to a PC with Microsoft® Windows® software. The transmitter can also be connected to a network with an optional LAN interface, which enables an Ethernet connection. A USB service cable makes it easy to connect PTU300 to a PC via the service port.

Outdoor Installation Kit

Outdoor installation is possible using the optional HMT330MIK installation kit, for applications requiring reliable measurements for meteorological purposes.

Flexible Calibration

Quick, one-point field calibration for humidity is easy using Vaisala Hand-Held Humidity Meter HM70.

With Vaisala Barometric Pressure Transfer Standard PTB330TS, including optional humidity and temperature probe, field check and calibration can be performed for all three parameters.

Applications

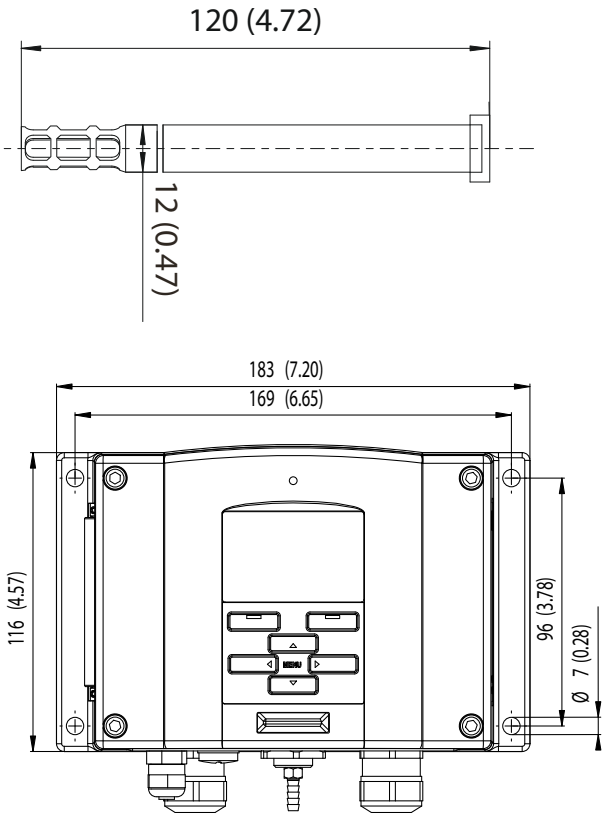
- Environmental monitoring in calibration laboratories
- Industrial applications in semiconductor industry, engine testing and maritime sector
- GPS meteorology: estimating precipitable water vapor in the atmosphere, weather stations

The display also shows the WMO pressure trend ΔP 3h and tendency of 0 ... 8.

Model

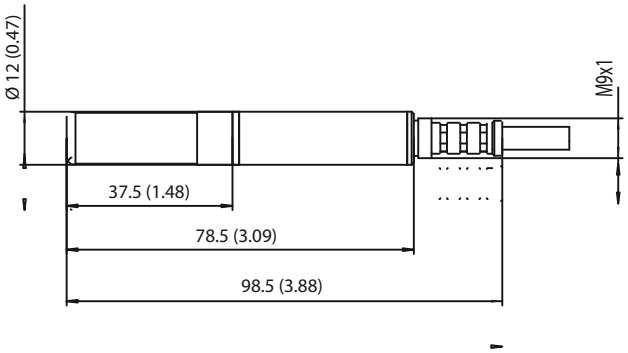
PTU301 for wall mounting

Dimensions in mm

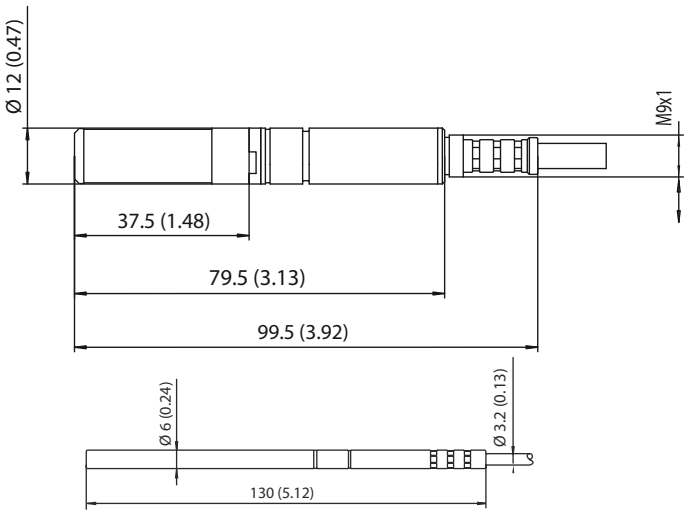


Model **Dimensions in mm**

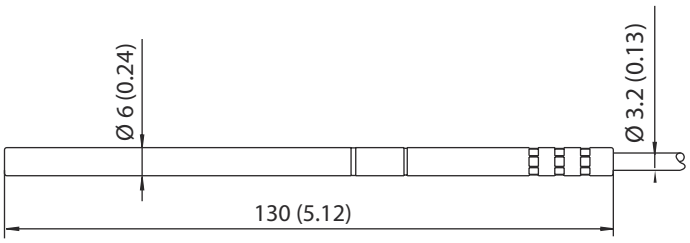
PTU303 probe for outdoor use

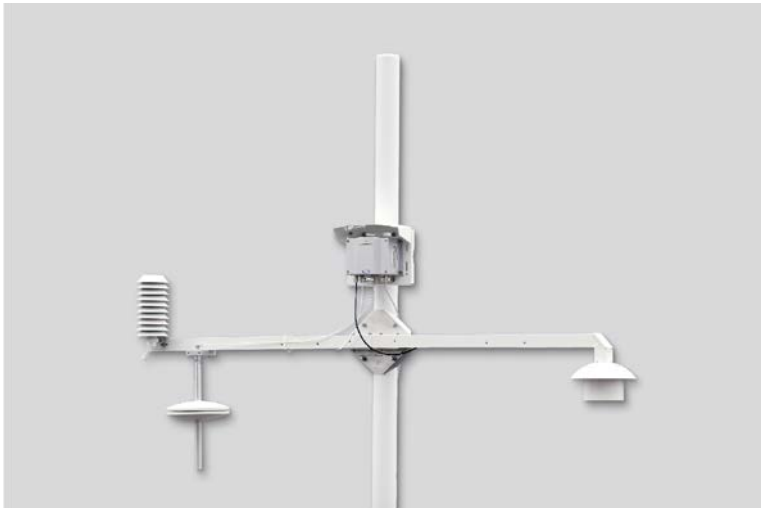


PTU307 warmed probe for demanding meteorological installations



PTU30T for pressure and temperature only measurement





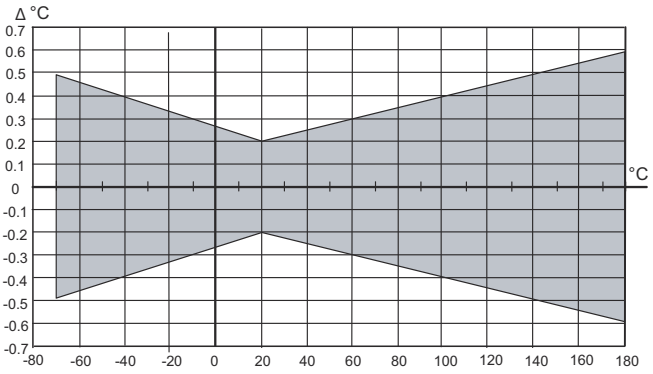
HMT330MIK Meteorological Installation Kit enables PTU307 to be installed outdoors to obtain reliable measurements for meteorological purposes.

Technical Data

Measurement Performance

Barometric Pressure			
Pressure range		500 ... 1100 hPa	50 ... 1100 hPa
Accuracy	500 ... 1100 hPa	500 ... 1100 hPa	50 ... 1100 hPa
	Class A	Class B	
Linearity	±0.05 hPa	±0.10 hPa	±0.20 hPa
Hysteresis	±0.03 hPa	±0.03 hPa	±0.08 hPa
Repeatability	±0.03 hPa	±0.03 hPa	±0.08 hPa
Calibration unceratinty	±0.07 hPa	±0.15 hPa	±0.20 hPa
Accuracy at +20 °C / +68 °F	±0.10 hPa	±0.20 hPa	±0.30 hPa
Temperature dependence	±0.1 hPa	±0.1 hPa	±0.3 hPa
Total accuracy (-40 ... +60 °C / -40 ... +140 °F)	±0.15 hPa	±0.25 hPa	±0.45 hPa
Long-term stability/year	±0.1 hPa	±0.1 hPa	±0.2 hPa
Response Time (100 % Response):			
One sensor	2 s	1s	1 s
Pressure units	hPa, mbar, kPa, Pa, inHg, mmH20, mmHg, torr, psia		
Relative Humidity			
Measurement range		0 ... 100 %RH	
Accuracy (Including Non-linearity, Hysteresis, and Repeatability):			
At +15 ... +25 °C / +59 ... +77 °F At -20 ... +40 °C / - 4... +104 °F At -40 ... +60 °C / -40 ... +140 °F		±1 %RH (0 ... 90 %RH) ±1.7 %RH (90 ... 100 %RH) ±(1.0 + 0.008 x reading) %RH ±(1.5 + 0.015 x reading) %RH	
Factory calibration uncertainty (+20 °C / +68 °F) (Defined as ±2 standard deviation limits. Small variations possible, see also calibration certificate.)		±0.6 %RH (0 ... 40 %RH) ±1.0 %RH (40 ... 97 %RH)	
Sensor for typical applications		Vaisala HUMICAP 180 or 180R	
Sensor for applications with chemical purge/warmed probe		Vaisala HUMICAP 180C or 180RC	
Response Time (90 %) at +20 °C (+68 °F) in Still Air:			
With grid filter With grid + steel netting filter With sintered filter		8 s / 17 s [1] 20 s / 50 s [1] 40 s / 60 s [1]	
Temperature			
Measurement range, housing (barometric pressure measurement limit) [2]		-40 ... +60 °C (-40 ... +140 °F)	
Measurement range, probes (operational limit when measuring RH or T)		PTU301: -40 ... +60 °C (-40 ... +140 °F) PTU303: -40 ... +80 °C (-40 ... +176 °F) PTU307: -40 ... +180 °C (-40 ... +356 °F) PTU30T: -70 ... +180 °C (-94 ... +356 °F) [3]	
Accuracy at +20 °C (+68 °F)		PTU301, PTU303, PTU307: ±0.2 °C (±0.4 °F) PTU30/T: ±0.1 °C (±0.18 °F)	
Temperature units		°C, °F	
Temperature sensor		Pt100 RTD Class F0.1 IEC 60751	

1) *With HUMICAP 180R or 180RC sensor*
2) *Note that the operational temperature limits of the PTU303, PTU307, and PTU30T probes are higher than for the PTU300 transmitter itself. The transmitter's temperature limit is based on the upper temperature limit for barometric pressure measurement, +60 °C (+140 °F)*
3) *PTU30T is used for T and P measurements only, RH measurement not in use.*



Accuracy over Temperature Range

Operating Environment

Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Operating temperature with optional display	0 ... +60 °C (+32 ... +140 °F)
Humidity range	Non-condensing
EMC compliance	EN61326-1, Industrial Environment

Note: Transmitter with display test impedance of 40 Ω is used in IEC61000-4-5 (Surge immunity)

Mechanical Specifications

Cable bushing	M20 x 1.5 for cable diameter 8 ... 11 mm / 0.31 ... 0.43"
Conduit fitting	1/2" NPT
User cable connector (optional) Option 1 Option 2	M12 series 8-pin (male) Female plug with 5 m (16.4 ft) black cable Female plug with screw terminals
Cable diameter, PTU303	6.0 mm
Cable diameter, other probes	5.5 mm
Standard probe cable lengths	2 m, 5 m or 10 m [1]
Housing material	G-AlSi 10 Mg (DIN 1725)
IP rating	IP66 IP65 (NEMA4X) with local display
Weight (depending on selected probe)	1.0 - 3.0 kg / 2.2 - 6.6 lb

1) *Additional cable lengths available, please see order form for details.*

Optional Data Logger with Real-time Clock

Logged parameters	Max. four with trend/min/max values
Logging interval	10 s (fixed)
Maximum logging period with maximum temporal resolution	4 years 5 months
Logged points	13.7 million points per parameter
Battery lifetime	Min. 5 years

Display

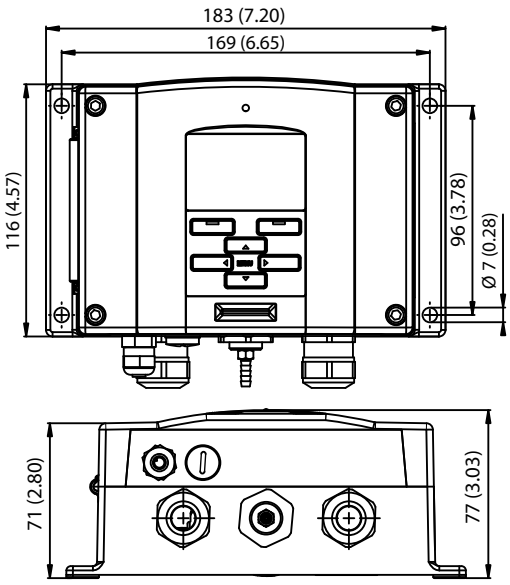
Material	LCD with backlight, graphical trend display of any parameter
Menu languages	English, Chinese, Finnish, French, German, Japanese, Russian, Spanish, Swedish

Inputs and Outputs

Operating voltage With optional power supply module	10 ... 35 VDC, 24 VAC ±20 % 100 ... 240 VAC, 50/60 Hz
Settling time at power-up (one sensor)	Class A: 4 s Class B: 3 s
Recommended wire size	0.5 mm^2 (AWG 20) stranded wires
Digital outputs	RS-232, RS-485 (optional)
Protocols	ASCII commands, Modbus RTU
Service connection	RS-232, USB
Relay outputs (optional)	0.5 A, 250 VAC
Power Consumption at +20 °C (+68 °F) (U_{in} 24 VDC)	
RS-232	Max. 28 mA
U_{out} 3 x 0 ... 1 V / 0 ... 5 V / 0 ... 10 V	Max. 33 mA
I_{out} 3 x 0 ... 20 mA	Max. 63 mA
Display and backlight	+20 mA
During chemical purge	Max. +110 mA
During probe heating	+120 mA
External Loads	
Current outputs	R_L < 500 Ω
0 ... 1 V output	R_L > 2 kΩ
0 ... 5 V and 0 ... 10 V outputs	R_L > 10 kΩ
Ethernet Interface (Optional)	
Supported standards	10BASE-T, 100BASE-TX
Connector	8P8C (RJ45)
IPv4 address assignment	DHCP (automatic), static
Protocols	Telnet, Modbus TCP/IP
Analog Outputs (Optional)	
Current output	0 ... 20 mA, 4 ... 20 mA
Voltage output	0 ... 1 V, 0 ... 5 V, 0 ... 10 V
Humidity and Temperature:	
Accuracy of analog outputs at +20 °C (+68 °F)	±0.05 °% full scale
Temperature dependence of analog outputs	±0.005 %/°C (0.003 %/°F) full scale
Pressure:	
Accuracy of analog outputs at +20 °C (+68 °F)	±0.30 hPa (500 ... 1100 hPa) ±0.40 hPa (50 ... 1100 hPa)
Accuracy of analog outputs at -40 ... +60 °C / -40 ... +140 °F	±0.60 hPa (500 ... 1100 hPa) ±0.75 hPa (50 ... 1100 hPa)

Spare Parts and Accessories

PC software and cable	215005
USB-RJ45 Serial Connection Cable	219685
Connection cable for HM70	211339
Wall mounting plate (plastic)	214829
Pole installation kit with rain shield	215109
DIN rail installation set	211477
Duct installation kit, PTU303/307	210697
Cable gland and AGRO, PTU303/307	HMP247CG
Solar radiation shield, PTU303/307/30T	DTR502B
Meteorological installation kit	HMT330MIK
Duct installation kit (T probe)	215003



Dimensions in mm (inches)

VAISALA
www.vaisala.com

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 professional meteorology and aviation, laboratories, demanding industrial applications

Vaisala BAROCAP® Digital Barometer PTB330 is a new-generation barometer, designed for a wide range of high-end atmospheric pressure measurement. 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. The 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 electronic working standard. All PTB330 barometers come with a traceable factory calibration certificate.

Reliability through Redundancy

According to your choice, PTB330 can incorporate one, two, or three BAROCAP sensors. When two or three 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 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 one-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

Barometric Pressure Range 500 ... 1100 HPA		
	Class A	Class B
Linearity [1]	±0.05 hPa	±0.10 hPa
Hysteresis [1]	±0.03 hPa	±0.03 hPa
Repeatability [1]	±0.03 hPa	±0.03 hPa
Calibration uncertainty [2]	±0.07 hPa	±0.15 hPa
Accuracy at +20 °C (+68 °F) [3]	±0.10 hPa	±0.20 hPa
Barometric Pressure Range 50 ... 1100 HPA		
		Class B
Linearity [1]		±0.20 hPa
Hysteresis [1]		±0.08 hPa
Repeatability [1]		±0.08 hPa
Calibration uncertainty [2]		±0.15 hPa
Accuracy at +20 °C [3]		±0.20 hPa
Temperature Dependence [4]		
500 ... 1100 hPa		±0.1 hPa
50 ... 1100 hPa		±0.3 hPa
Total Accuracy −40 ... +60 °C (−40 ... +140 °F)		
	Class A	Class B
500 ... 1100 hPa	±0.15 hPa	±0.25 hPa
50 ... 1100 hPa		±0.45 hPa
Long-term Stability		
500 ... 1100 hPa		±0.1 hPa/year
50 ... 1100 hPa		±0.1 hPa/year

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.*

Operating Environment

Pressure range	500 ... 1100 hPa, 50 ... 1100 hPa
Operating temperature	−40 ... +60 °C (−40 ... +140 °F)
Operating temperature with local display	0 ... +60 °C (+32 ... +140 °F)
Compliance	EMC standard EN61326-1:1997 + Am1:1998 + Am2:2001: Industrial Environment

Data Transfer Software

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

Mechanical Specifications

Housing material	G AlSi10 Mg (DIN 1725)
Housing classification	IP66 IP65 (NEMA4) with local display
Weight	1 - 1.5 kg (2.2 - 3.3 lbs)

Inputs and Outputs

Supply voltage		10 ... 35 VDC
Supply voltage sensitivity		Negligible
Typical power consumption at +20 °C (U_{in} 24 VDC, one pressure sensor)		
RS-232		25 mA
RS-485		40 mA
U_{out}		25 mA
I_{out}		40 mA
Display and backlight		+20 mA
Serial I/O		RS-232C, RS-485, RS-422
Pressure units		hPa, mbar, kPa, Pa inHg, mmH20, mmHg, torr, psia
	Class A	**Class B**
Resolution	0.01 hPa	0.1 hPa
Settling time at startup (one sensor)	4 s	3 s
Response time (one sensor)	2 s	1 s
Acceleration sensitivity		Negligible
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
Maximum pressure limit		5000 hPa abs.

Analog Output (Optional)

Current output	0 ... 20 mA, 4 ... 20 mA	
Voltage output	0 ... 1 V, 0 ... 5 V, 0 ... 10 V	
Accuracy at pressure range	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

Accessories

Serial interface cable	19446ZZ
USB-RJ45 serial connection cable	219685
Software interface kit	215005
Wall mounting kit	214829
Outdoor installation kit (weather shield)	215109
Installation kit for pole or pipeline	215108
Power supply module	POWER-1
Temperature compensated analog output module	AOUT-1T
Isolated RS-485 module	RS485-1
DIN Rail Kit	215094

VAISALA
www.vaisala.com

PTB330TS Barometric Pressure Transfer Standard

Take the Lab to the Field

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

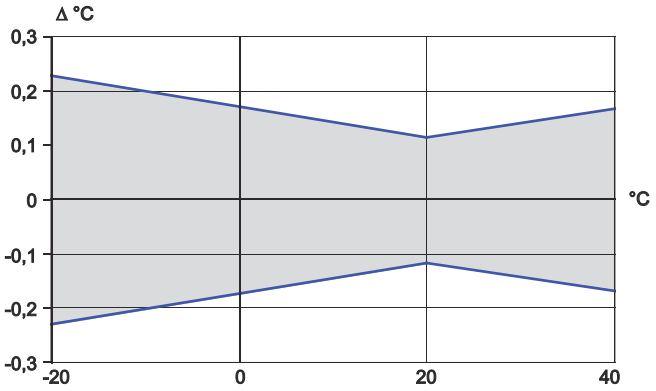
- ISO/IEC 17025 Accredited calibration for PTB330
- HMP155 options: additional temperature probe, manually controlled chemical purge feature
- MI70 Link software and USB or RS-232 cable for downloading measurement data to a computer
- USB service cable for connecting to PTB330 service port

Technical Data

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

General

Operating temperature	-10 ... +40 °C (+14 ... +104 °F)
Operating humidity	Non-condensing
Maximum pressure limit	5000 hPa abs.
Power supply	Rechargeable NiMH battery pack with AC-adapter or 4xAA-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
Compliance	• EMC Directive (2004/108/EC) Complies with the EMC product family standard EN61326-1 • Electrical equipment for measurement control and laboratory use • Basic immunity test requirements. • Low Voltage Directive (2006/95/EC) • ROHS Directive (2002/95/EC)
Operation Time (Using Rechargeable Battery Pack)	
Continuous use with PTB330	11 h typical at +20 °C (+68 °F)
Datalogging use	Up to 30 days



Accuracy of HMP155 temperature measurement over temperature range

Measurement Performance

Barometric Pressure (PTB330)	
Measurement range	500 ... 1100 hPa
Linearity[1)]	±0.05 hPa
Hysteresis[1)]	±0.03 hPa
Repeatability[1)]	±0.03 hPa
Calibration uncertainty[2)]	±0.07 hPa
Accuracy at +20 °C (+68 °F) [3)]	±0.10 hPa
Temperature dependence[4)]	±0.1 hPa
Total accuracy -40 ... +60 °C (-40 ... +140 °F)	±0.15 hPa
Long-term stability	±0.1 hPa/year
Settling time at startup (one sensor)	4 s
Response time (one sensor)	2 s
Acceleration sensitivity	Negligible
Relative Humidity (HMP155)	
Measurement range	0 ... 100 %RH
Accuracy (incl. non-linearity, hysteresis and repeatability)	
at +15 ... +25 °C (+59 ... +77 °F)	±1 %RH (0 ... 90 %RH) ±1.7 %RH (9 ... 100 %RH)
at -10 ... +40 °C (-4 ... 104 °F)	±(1.0 + 0.008 reading) %RH
Factory calibration uncertainty at +20 °C (+68 °F)	±0.6 %RH (0 ... 40 %RH) [5)] ±1.0 %RH (40 ... 97 %RH)[5)]
Humidity sensor	HUMICAP180R HUMICAP180RC
Response time at +20 °C in still air with a sintered PTFE filter	
63%	20 s
90%	60 s
Temperature (HMP155)	
Measurement range	-10 ... +40 °C (+14 ... +104 °F)
Accuracy	
-10 ... +20 °C	±(0.176 - 0.0028 x temperature) °C
+20 ... +40 °C	±(0.07 + 0.0025 x temperature) °C
Temperature sensor	Pt100 RTD Class F0.1 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 calibration certificate.

Available Parameters

Pressure parameters	P, P3h, HCP, QFE, QNH
Humidity and temperature parameters	RH, T, Tdf, Td, x, Tw

Inputs and Outputs

MI70 probe ports	2
MI70 data interface	RS-232 (accessible only with MI70 Link software)
PTB330 supply voltage	10 … 35 VDC (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

PTB330	
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
HMP155	
Housing material	PC
IP rating	IP66
Additional T-probe cable length	2 m
Cable material	PUR
Sensor protection	Sintered PTFE
MI70 Measurement Indicator	
IP rating	IP54
Housing material	ABS/PC blend
Transport Case	
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 lbs)
Exterior dimensions (L × W × H)	405 × 330 × 165 mm (15.94 × 12.99 × 6.50 in)

Spare Parts and Accessories

PTB330	
MI70 – PTB330 spiral cable	223235SP
USB-RJ45 serial connection cable	219685
Serial connection cable	19446ZZ
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
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 sensor	HUMICAP180R
Humidity calibrator	HMK15

PTB210 Digital Barometer

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 and ships, airports, and agrology. They are 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. They are available in two basic 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, that 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 (Units in hPa), Accuracy			
Pressure range	500 ... 1100		50 ... 1100
	Class A	Class B	
Non-linearity[1)]	± 0.10	± 0.15	± 0.20
Hysteresis[1)]	± 0.05	± 0.05	± 0.10
Repeatability[1)]	± 0.05	± 0.05	± 0.10
Calibration uncertainty[2)]	± 0.07	± 0.15	± 0.20
Accuracy at +20 °C (+68 °F)[3)]	± 0.15	± 0.20	± 0.35
Temperature dependence[4)]	± 0.20	± 0.20	± 0.40
Total accuracy -40 ... +60 °C (-40 ... +140 °F)[3)]	± 0.25	± 0.30	± 0.50
Long term stability (hPa/year)	± 0.10	± 0.10	± 0.20
Analog Output, Accuracy			
Non-linearity[1)]		± 0.20 hPa	
Hysteresis[1)]		± 0.05 hPa	
Repeatability[1)]		± 0.05 hPa	
Calibration uncertainty[2)]		± 0.15 hPa	
Accuracy at +20 °C (+68 °F)[3)]		± 0.30 hPa	
Temperature dependence[4)]		± 0.50 hPa	
Total accuracy -40 ... +60 °C (-40 ... +140 °F)[3)]		± 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

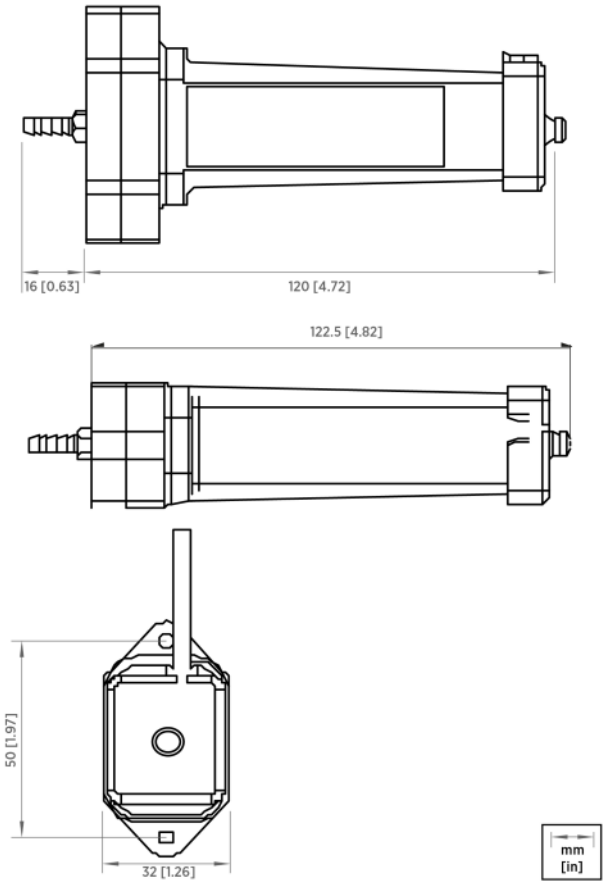
Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Operating humidity	Non-condensing
EMC compliance	EN61326-1, Generic Environment

Mechanical Specifications

Housing material	PC Plastic
IP rating, electronics	IP65 (NEMA 4)
IP rating, sensor	IP53
Instrument weight	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, power down mode	< 0.8 mA
Current consumption, shutdown mode	0.2 mA
Analog Output	
Outputs	0 ... 5 VDC, 0 ... 2.5 VDC (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 abs.
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 VDC
Supply voltage (reverse polarity protected), with RS-485 or analog output	8 ... 18 VDC


16 [0.63]
120 [4.72]
122.5 [4.82]
50 [1.97]
32 [1.26]
mm
[in]

PTB110 Barometer for Industrial Use

Features

- Vaisala BAROCAP® sensor
- Several pressure ranges
- Accuracy ±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 ... 1 100 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
Accuracy	
Linearity [1]	±0.25 hPa
Hysteresis [1]	±0.03 hPa
Repeatability [1]	±0.03 hPa
Pressure calibration uncertainty [2]	±0.15 hPa
Voltage calibration uncertainty	± 0.7 mV
Frequency calibration uncertainty	± 0.3 Hz
Accuracy at +20 °C (+68 °F) [3]	±0.3 hPa
Total Accuracy at	
+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

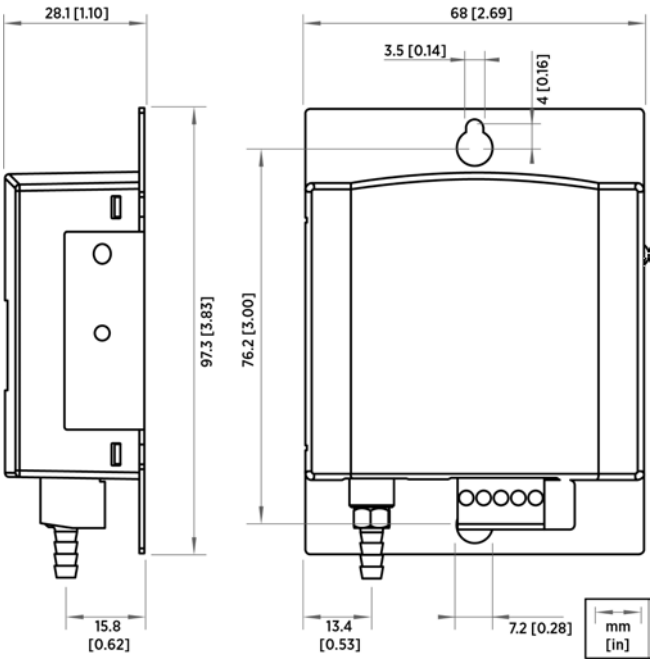
Operating temperature	−40 ... +60 °C (−40 ... +140 °F)
Storage temperature	−40 ... +60 °C (−40 ... +140 °F)
Operating humidity	Non-condensing
EMC compliance	EN/IEC 61326-1, Electrical equipment for measurement, control and laboratory use - industrial environment

Mechanical Specifications

IP rating	IP32
Dimensions (H × W × D)	97.3 × 68.4 × 28.1 mm (3.83 × 2.69 × 1.10 in)
Weight	90 g (3.2 oz)
Materials	
Housing cover	Plastic ABS/PC blend
Mounting plate	Aluminum

Inputs and Outputs

Supply voltage	10 ... 30 VDC
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 VDC 0 ... 5 VDC
Output frequency	500 ... 1100 Hz
Pressure connector	M5 (10 ... 32) internal thread
Pressure fitting	Barbed fitting for ⅛ 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



VAISALA
www.vaisala.com

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 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 two 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. The heated SPH20 contains a thermostat that switches on the warming power at temperatures where the risk of icing may occur.

Composed of ultraviolet stabilized 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)

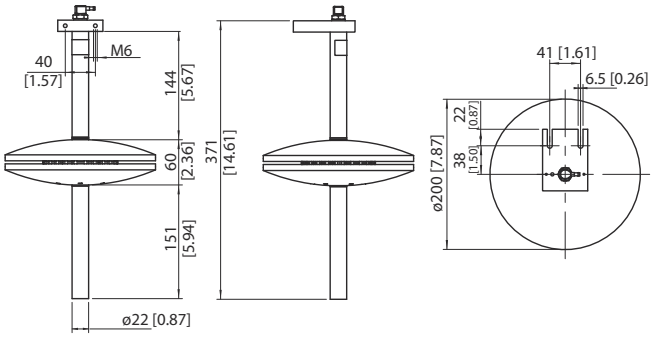
Mechanical Specifications

Weight	SPH10: 800 g (1.76 lb) SPH20: 1360 g (3.0 lb)
Materials	PC plastic, offshore aluminium
Mounting	With 2 bolts (M6 × 20 mm min.)
Hose connection	Barbed fitting for 4 mm I.D. hose or Rp1/4 thread (parallel)

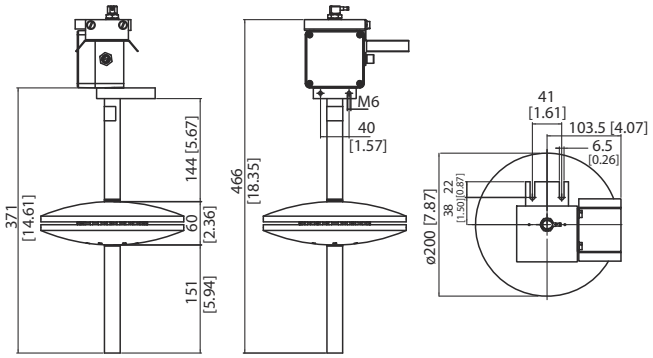
SPH20 Inputs and Outputs

Electrical connections	M12 connector
Power supply	Factory setting: 12 V Changed connection: 24 V
Power consumption during heating	70 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)

Dimensions in mm (inches)



SPH10



SPH20

VAISALA

www.vaisala.com