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# PTU300 Combined Pressure, Humidity and Temperature Transmitter for Demanding Applications



The Vaisala Combined Pressure, Humidity and Temperature Transmitter PTU300 is a versatile, multi-purpose instrument.

#### Features/Benefits

- Barometric pressure, humidity, and temperature measurement in one transmitter
- Available with up to two barometric pressure sensors for added reliability
- RS232C serial interface with NMEA protocol for GPS use
- Graphical display and keypad for convenient operation
- Analog outputs, RS232/485, WLAN/LAN
- MODBUS protocol support (RTU/TCP)
- Optional universal power supply module
- NIST traceable calibration (certificate included)
- HMT330MIK installation kit for outdoor use
- Applications include environmental monitoring in calibration laboratories, industrial applications, GPS meteorology: estimating precipitable water vapor in the atmosphere, weather stations

### One Transmitter, Three Measurements

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

You can choose from the following probe options: PTU301 for laboratories, 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

The 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

The 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

The PTU300 comes with a standard RS232 serial interface. The output format is compatible with major GPS receivers and NMEA-coded messages. An isolated RS485 is available as an option.

The PTU300 is also capable of applying the MODBUS communication protocol and, together with an appropriate connection option, provides either MODBUS RTU (RS485) or MODBUS TCP/IP (Ethernet) communication.

The data logger, with real-time clock and battery backup, guarantees reliable logging of measurement data for over four years. The recorded data 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 (W)LAN interface, which enables a (wireless) Ethernet connection. A USB service cable makes it easy to connect the 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 the 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.

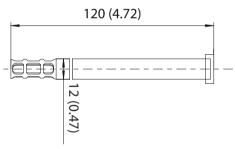
## PTU300 Models



PTU301 for wall mounting

#### **Dimensions**

Dimensions in mm (inches)

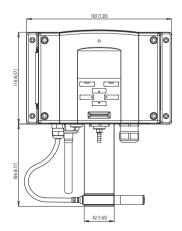




PTU301 short cable probe with optional WLAN

#### **Dimensions**

Dimensions in mm (inches)



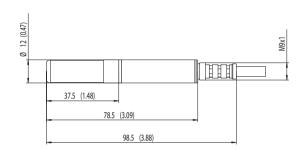
## PTU300 Models



PTU303 probe for outdoor use

#### **Dimensions**

Dimensions in mm (inches)

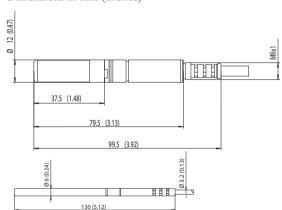




PTU307 warmed probe for demanding meteorological installations

#### **Dimensions**

Dimensions in mm (inches)

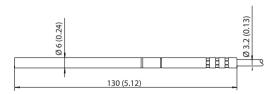




PTU30T for pressure and temperature only measurement

#### **Dimensions**

Dimensions in mm (inches)



## **Technical Data**

#### **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	±0.07 hPa	±0.15 hPa	±0.20 hPa	
uncertainty**				
Accuracy at +20 °	C*** ±0.10 hPa	±0.20 hPa	±0.30 hPa	
Temperature	±0.1 hPa	±0.1 hPa	±0.3 hPa	
dependence****				
Total accuracy	±0.15 hPa	±0.25 hPa	±0.45 hPa	
(-40 +60 °C/				
-40 +140 °F)				
Long-term stabilit	y/year ±0.1 hPa	±0.1 hPa	±0.2 hPa	
Response time (100 % response)				
one sensor	2 s•	1 s•	1 s•	

Pressure units hPa, mbar, kPa, Pa, inHg, mmH20, mmHg, torr, psia Defined as ±2 standard deviation limits of endpoint non-linearity,

- hysteresis error or repeatability error and calibration. Defined as ±2 standard deviation limits of accuracy in the working standard including NIST traceability.
- Defined as the root sum of the squares (RSS) of endpoint non-linearity, hysteresis error, repeatability error and calibration uncertainty at room
- \*\*\*\* Defined as  $\pm 2$  standard deviation limits of temperature dependence over the operating temperature range.

#### RELATIVE HUMIDITY

Measurement range	0 100 %RH	
Accuracy (including non-linearity,		
hysteresis, and repeatability at		
+15 +25 °C	±1 %RH (0 90 %RH)	
	±1.7 %RH (90 100 %RH)	
at -20 +40 °C	$\pm (1.0 + 0.008 \text{ x reading}) \% RH$	
at -40 +60 °C	$\pm (1.5 + 0.015 \text{ x reading}) \% RH$	
Factory calibration uncertainty (+20 °C)		
(Defined as ±2 standard deviation	± 0.6 %RH (0 40 %RH)	
limits. Small variations possible,	± 1.0 %RH (40 97 %RH)	

Sensor

Vaisala HUMICAP® 180 or 180R\* for typical applications for applications with chemical

Vaisala HUMICAP® 180C or 180RC\* purge/warmed probe

Response time (90%) at +20 °C (+68 °F) in still air

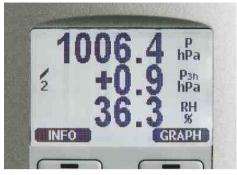
with grid filter  $8 \, \text{s} / 17 \, \text{s}^*$ with grid + steel netting filter  $20 \, s / 50 \, s^*$ with sintered filter 40 s / 60 s\*

\* with HUMICAP® 180R or 180RC sensor

see also calibration certificate.)

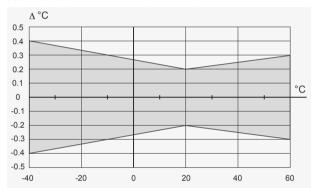
TEMPERATURE

Measurement range, all probes -40 ... +60 °C (-40 ... +140 °F) ± 0.2 °C (± 0.4 °F) Accuracy at +20 °C (+68 °F) °C, °F Temperature units



The display also shows the WMO pressure trend  $\Delta P$  3h and tendency of 0 ... 8.

#### ACCURACY OVER TEMPERATURE RANGE



Temperature sensor Pt100 RTD Class F0.1 IEC 60751

#### **Operating Environment**

operating minutes		•
	Operating temperature	-40 +60 °C (-40 +140 °F)
	with optional display	0 +60 °C (+32 +140 °F)
	Humidity range	non-condensing
	Electromagnetic compatibility	Complies with EMC standard
		EN61326-1, Industrial Environment
	Note: Transmitter wit	h dieplay tost impodance of 10 ohm

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

 $0 \dots 5 V$  and  $0 \dots 10 V$  outputs

Inputs and Outputs					
Operating voltage	10 35 VDC, 24 VAC ±20%				
with optional power supply module	100 240 VAC, 50/60 Hz				
Power consumption at +20 °C (U <sub>in</sub> 24 VDC)					
RS232	max. 28 mA				
U <sub>out</sub> 3 x 0 1 V/0 5 V/0 10 V	max. 33 mA				
I <sub>out</sub> 3 x 0 20 mA	max. 63 mA				
display and backlight	+20 mA				
during chemical purge	max. +110 mA				
during probe heating	+120 mA				
Settling time at power-up (one sensor)					
class A	4 s				
class B	3 s				
External loads					
current outputs	$R_{L} < 500 \text{ ohm}$				
0 1 V output	$R_L > 2 \text{ kohm}$				

 $R_1 > 10 \text{ kohm}$ 

Recommended wire size	ze 0.5 mm <sup>2</sup> (AWG 20) stranded wires		
Digital outputs	RS232, RS485 (optional)		
Protocols	ASCII commands, MODBUS RTU		
Service connection	RS232, USB		
Relay outputs (optional	l) 0.5 A, 250 VAC		
Ethernet interface (opt	ional)		
Supported standards	10BASE-T, 100BASE-TX		
Connector	8P8C (RJ45)		
IPv4 address assignm	nent DHCP (automatic), static		
Protocols	Telnet, MODBUS TCP/IP		
WLAN interface (option	nal)		
Supported standards	802.11b		
Antenna connector t	J 1		
IPv4 address assignm	nent DHCP (automatic), static		
Protocols	Telnet, MODBUS TCP/IP		
Security	WEP 64/128, WPA2		
Authentication / Encryption (WLAN)			
Open / no encryption			
Open / WEP			
	WPA Pre-shared key / TKIP		
WPA Pre-shared key / CCMP (a.k.a. WPA2)			
Optional data logger w			
Logged parameters	max. four with trend/min/max values		
Logging interval	10 sec. (fixed)		
Max. logging period	4 years, 5 months		
Logged points	13.7 million points per parameter		
Battery lifetime	min. 5 years		
Display	LCD with backlight, graphical trend display		
	of any parameter		

Analog outputs (optional)

Menu languages

current output  $0 \dots 20 \text{ mA}, \ 4 \dots 20 \text{ mA}$  voltage output  $0 \dots 1 \text{ V}, 0 \dots 5 \text{ V}, 0 \dots 10 \text{ V}$ 

English, Chinese, Finnish, French, German, Japanese, Russian, Spanish, Swedish

Humidity and temperature

accuracy at +20 °C  $\pm 0.05\%$  full scale temperature dependence Pressure 500 ... 1100 hPa accuracy at +20 °C  $\pm 0.30$  hPa accuracy at -40 ... +60 °C  $\pm 0.60$  hPa  $\pm 0.75$  hPa

#### **Mechanics**

Cable bushing M20 x 1.5 for cable diameter  $8 \dots 11 \text{ mm/0.31} \dots 0.43^{"}$  Conduit fitting 1/2" NPT User cable connector (optional) M12 series 8-pin (male) option 1 female plug with 5 m (16.4 ft) black cable option 2 female plug with screw terminals

Probe cable diameter

 $\begin{array}{cc} \text{PTU303} & \text{6.0 mm} \\ \text{other probes} & \text{5.5 mm} \\ \text{Standard probe cable lengths} & \text{2 m, 5 m or 10 m} \end{array}$ 

(Additional cable lengths available, please

see order form for details)

Housing material G-AlSi 10 Mg (DIN 1725) Housing classification IP 66

IP65 (NEMA4X) with local display

Weight

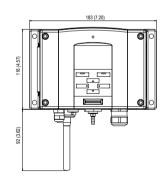
depending on selected probe 1.0 - 3.0 kgs

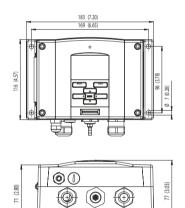
#### **Accessories**

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**

Dimensions in mm (inches)





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