

METEOROLOGICAL THERMO-HYGROMETER MODEL PTU-2000

PRELIMINARY BULLETIN PTU-2000

$$p = \frac{pRT}{m}$$

$$S(\lambda) = S_0(\lambda) e^{-\alpha(\lambda)}$$

$$B(T) = bT^4$$

Description

The Model PTU-2000 is a complete precision pressure, ambient temperature, and humidity professional quality measuring system designed for the meteorologist, climatologist, or atmospheric scientist. It provides accurate and reliable measurements achieving an absolute accuracy of $\pm 0.2^\circ\text{C}$ in measuring ambient temperature over the entire $\pm 50^\circ\text{C}$ range, relative humidity accuracy of $\pm 2\%$ and pressure accuracy of $\pm 0.03''$ Hg. The system consists of an aspirated double-shielded platinum resistance thermometer, polymer capacitance hygrometer sensor, and solid state pressure sensor.

Ambient temperature is highly variable in both time and space, and a single measurement reflects a limited space-time domain. Historically, techniques other than direct measurement of ambient temperature have provided support for the global warming issue, but precise knowledge of atmospheric ambient temperatures is a fundamental component to understanding the Earth's climatic mechanisms. As we continue collecting ambient temperature data for the climatological database, improvements in the basic measurement are required. While some of the problems of measuring ambient temperature cannot be easily eliminated, basic instrumental and observational errors in climatic temperature measurements can be reduced using the PTU-2000.

Features

- High accuracy
- Maximum sensor protection with double intake radiation shields plus canopy shade ring
- Fully aspirated
- Analog output
- Reliable solid-state detection technology
- Precision platinum resistance thermometer
- Solid state pressure transducer
- Low maintenance



PTU-2000 system

Applications

- Professional grade meteorological stations
- Educational institutions
- Aviation weather systems
- Agricultural

Mechanical Configuration

The PTU-2000 electronics are packaged in a weatherproof NEMA-type PVC enclosure. The radiation shields are manufactured with white UV-resistant materials. Electrical and mechanical components are designed to operate over a temperature span of $\pm 50^\circ\text{C}$. The system typically mounts two meters above the ground to a tower or support and aimed into the prevailing wind.



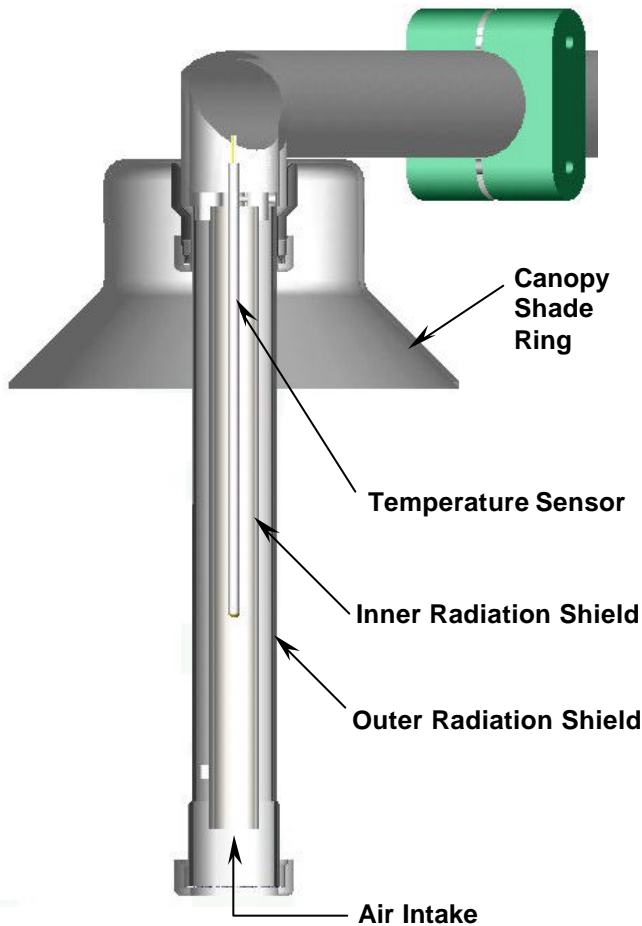
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PTU-2000 sensor head.



Detailed view of bottom of temperature sensor showing double intake radiation shields, canopy shade ring, and screen.



Cross section identifying temperature sensor, double shielding, canopy shade ring, and air intake.

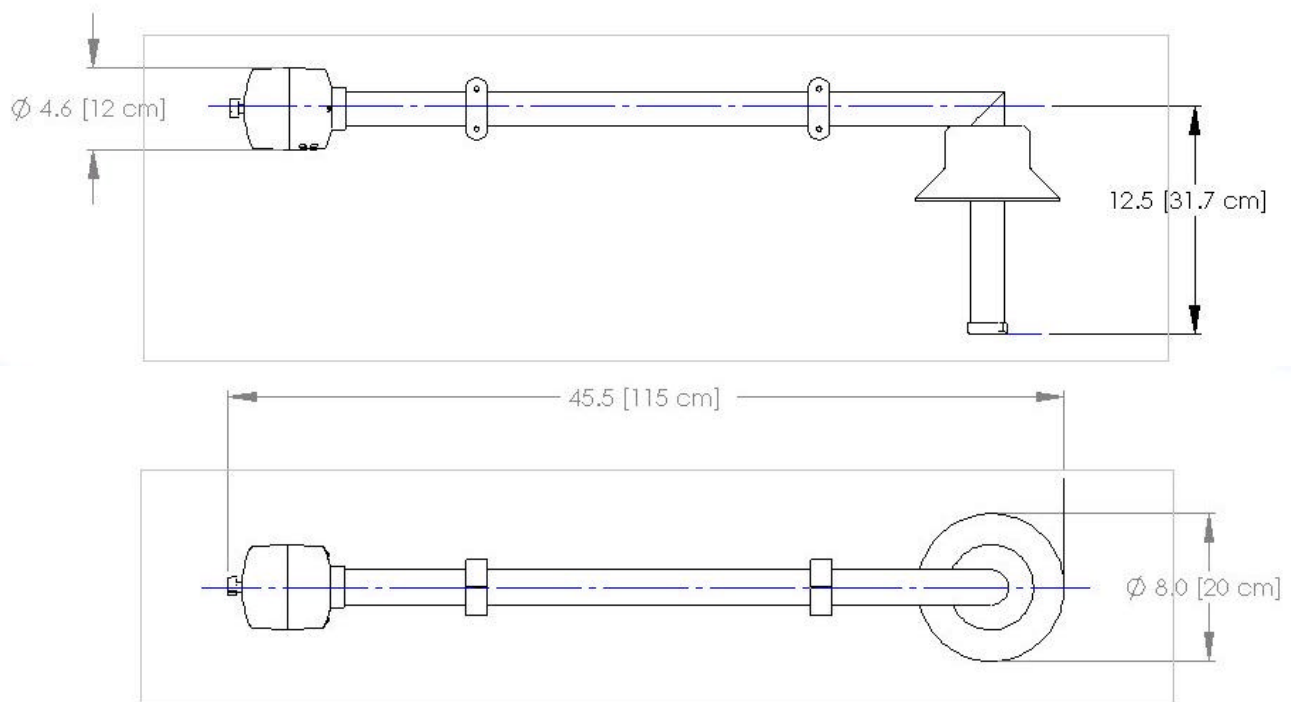
Electrical Connections

Two foil-shielded 10' (3m) long cables are supplied with pig tails for interface to the user's junction box:

- DC power input; isolated return analog output
- Power cable for + 12 Vdc
- Twisted pair 4-20 mA or 0-1 Vdc for temperature
- Twisted pair 4-20 mA or 0-1 Vdc for humidity
- Twisted pair 4-20 mA or 0-1 Vdc for pressure

Available Options

- Spare aspiration blower
- Spare aspiration screen



Mechanical Interface, Dimensions in inches (cm)

Specifications

Power Requirement

11-14 Vdc, 250 mA

Environmental Operating Range

±50°C

Aspiration Rate

Approximately 400 FPM

Dimensions

45.5" long x 8.0" wide x 12.5" high (115 cm x 20 cm x 31.7 cm)

Weight

4.5 lb (2.0 kg)

Temperature Measurement

Type: Platinum resistance thermometer

Measuring Range: +50°C to -50°C

Accuracy: ±0.2°C

Analog Output: 1-5 Vdc

Humidity Measurement

Type: Polymer capacitance

Measuring Range: 0 to 100% RH

Operating Temperature: +60°C to -40°C

Accuracy: ±2% RH

Stability: ±1% over 5 years

Linearity: ±0.5% RH

Hysteresis: ±1.2% of RH span maximum

Repeatability: ±0.5% RH

Response time: 15 sec in slowly moving air at 25°C

Analog Output: 1-5 Vdc

Pressure Measurement

Type: Solid state

Range: 1100 mb to 600 mb (32.50 to 17.70 in Hg)

Operating Temperature: +60°C to -40°C

Accuracy: ±0.3 mb (0.01 in Hg) at 20°C

±1 mb (0.03 in Hg) over temperature range

Analog Output: 1-5 Vdc



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