Applied Technologies, Inc.

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"V" Style Sonic Anemometer/Thermometer

"V" Style Probe

A special design for turbulence, where the eddy measurement must be the smallest, and for flux measurements in plant and forest canopies where wind speeds are very low and directions highly unpredictable.

Features

- Single component wind velocity
- Fast response wind velocity
- Fast response temperature
- Extreme accuracy
- Microprocessor based
- Solid-state digital operation
- No moving parts
- Unattended operation
- Ease of mounting
- Rugged construction
- Low power
- DC powered
- True orthogonal measurements
- 3D winds

General

The Applied Technologies, Inc. (ATI) Sonic Anemometer/Thermometer is a microprocessor based wind sensor capable of measuring wind velocity in one, two, or three axes with reliable accuracy. The instrument is designed to measure wind velocity components by transmitting and receiving sonic signals along fixed orthogonal directions. The microcomputer electronics then process this information and calculates the wind speed for each axis. Since there are no moving parts to come into dynamic equilibrium with the air-flow, the Sonic Anemometer/Thermometer responds rapidly to wind velocity fluctuations. It responds linearly to wind velocity and is free from contamination from other velocity components as well as pressure, temperature, and relative humidity. The calibration of the sensor is established by its design parameters and therefore, can be used as an absolute wind instrument. That is correct, an Absolute Wind Instrument, with an accuracy that is controlled by the operator.

The electronics are all contained within the probe bar, and the transducers are completely sealed. This allows it to be operated as a tower mounted instrument, capable of withstanding hostile environmental conditions. The transducer operation and sonic functions, as well as all computation and transmission of data are under microprocessor control.

Data from the Sonic Anemometer/Thermometer are digital in nature. The output is RS-232C compatible in a UART asynchronous format. It represents the data in ASCII decimal numbers, and may be connected directly to a computer, transmitted to any digital recording device, or the format is such that it can also be read directly on a terminal. The temperature information is the sonic temperature of the measured winds and is calculated from the vertical sonic measurements.

Specifications

Measurement Range:

Wind velocity	±15 m/sec
Temperature	-50 to +70°C
Wind Direction	0 – 359 Degrees

Path Length:

"V" Probe	10 cm

Accuracy:

Wind Speed	±0.01 m/sec
Orthogonality	±0.1 degrees
Temperature (absolute)	1.2°C
Sonic Temperature	±0.1°C or ±0.05°C

Resolution:

Wind Speed	0.01 m/sec (normal) 0.001 m/sec (optional)
Wind Direction	0.1 degrees
Temperature	0.01°C

Output:

Data Rate	<1 Hz to 200 Hz - Variable
Digital	Serial RS-232C compatible RS-422 optional
Baud Rate	4800 or 460,800
Speed of Sound	Operator Optional

Operating Temperature Range:	-50°C to +70°C
Power Requirements:	+12 VDC@ <50 mA, (9 – 32 VDC)

Probe Array:

"V" - Three Axis	17.8cm x 17.8cm x 17.8cm
Weight	<1.0kg
Mounting:	3.175 cm square tube

Functions

- Ability to do remote commands through the serial port
- Perform internal calibration to maintain accuracy
- User programmable data rates and averaging, from 1 output per 60 min. to 200 Hz
- Select data averaging or median filter
- Select from several output formats
- Select from several baud rates
- Synchronize sonic operation to external trigger
- Ability to output a trigger pulse for other instruments
- Select the output Speed of Sound and/or Temperature
- Enter RH value for more accurate temperature output
- User adjustments to temperature calculations
- Change horizontal velocity to wind speed & direction, while retaining vertical and temperature
- User adjustments to data quality calculations
- Ability to provide data quality status word in output format
- Turn flow distortion correction on or off
- User adjustments to flow distortion calculations