



## Wind Energy Sensors

Sensors for Wind Energy Applications







*Rugged, Reliable, and Ready  
for any Application*



Most meteorological sensors can be measured by our dataloggers, allowing stations to be customized for each site. Typical sensors used on our

stations include, but are not limited to: wind speed, wind direction, barometric pressure, temperature, relative humidity, and delta temperature.

### CUP ANEMOMETERS

		Signal Type/Output	Measurement Description	Output Range	Operating Temperature	Calibration
<b>P2546A-L</b>   IEC Class 1 Performance		contact closure (pulse)	wind speed	0 to 70 m s <sup>-1</sup>	-30° to 70°C	IEC 61400-12-1 MEASNET
<b>A100LK-L</b>   IEC Class 1 Performance Great for turbulent terrain		electronic pulse	wind speed	0 to 77 m s <sup>-1</sup>	-30° to 70°C	IEC 61400-12-1 MEASNET
<b>Thies 4.3351.10.000<sup>a</sup></b>   IEC Class 1 Performance		opto-electronic converted to square wave (pulse)	wind speed	0.3 to 75 m s <sup>-1</sup>	-50° to 80°C	IEC 61400-12-1 MEASNET
<b>Thies 4.3351.00.000<sup>a</sup></b>   Heated Anemometer with IEC Class 1 Performance		opto-electronic converted to square wave (pulse)	wind speed	0.3 to 75 m s <sup>-1</sup>	-50° to 80°C	IEC 61400-12-1 MEASNET
<b>MetOne 011E<sup>a</sup></b>   IEC Class 1 Performance		optical chopper (pulse)	wind speed	0 to 60 m s <sup>-1</sup>	-50° to 85°C	IEC 61400-12-1 MEASNET
<b>#40C</b>   Wind Speed Sensor		low level ac sine wave (pulse)	wind speed	1 to 96 m s <sup>-1</sup>	-55° to 60°C	--

More info: 435.227.9120

[campbellsci.com/wind-energy](http://campbellsci.com/wind-energy)



## WIND VANES

**020C-L** | Reliable and accurate



	Measurement	Measurement Description	Output Range	Operating Temperature
	potentiometer (half bridge)	wind direction	0° to 360°	-50° to 85°C

<b>200P</b>   Wind Direction Sensor	analog potentiometer (half bridge)	wind direction	0° to 360°	-55° to 60°C
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<b>Thies 4.3150.10.212<sup>a</sup></b>   First Class, Accurate and Rugged	analog potentiometer (half bridge)	wind direction	0° to 360°	-50° to 80°C
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<b>Thies 4.3150.00.212<sup>a</sup></b>   Heated First Class Transmitter Accurate and Rugged	analog potentiometer (half bridge)	wind direction	0° to 360°	-50° to 80°C
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## HELICOID & ULTRASONIC ANEMOMETERS

**05108-45-L** | Alpine Version  
Wind Monitor-HD,  
High Performance  
Designed to prevent ice buildup



**Thies 4.382x.xx.xxx<sup>a</sup>** | Robust and well suited for cold climates  
Heated transducers and arms



**Vaisala WMT700<sup>a</sup>** | Heated and Suited for Cold Climates



**WINDSONICX-L** | High Quality and Lightweight



**RM Young 85004<sup>a</sup>** | Heated Ultrasonic for Extended Cold Weather Use



Signal Type/Output	Measurement Description	Output Range	Operating Temperature
analog potentiometer, ac sine wave	wind speed and direction	<u>Wind Speed</u> 0 to 100 m s <sup>-1</sup>  <u>Direction</u> 0° to 360°	-50° to 70°C

RS-485, RS-232, analog (configurable for other types)	wind speed and direction	<u>Wind Speed</u> 0 to 75 m s <sup>-1</sup>  <u>Direction</u> 0° to 360°	-50° to 70°C
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RS-485, RS-422, RS-232, SDI-12 (user programmable)	wind speed and direction	<u>Wind Speed</u> 0 to 75 m s <sup>-1</sup>  <u>Direction</u> 0° to 360°	-55° to 70°C
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RS-485, RS-232, SDI-12	wind speed and direction	<u>Wind Speed</u> 0 to 60 m s <sup>-1</sup>  <u>Direction</u> 0° to 359°	-35° to 70°C
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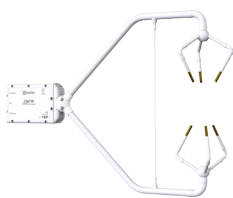
RS-485	wind speed and direction	<u>Wind Speed</u> 0 to 70 m s <sup>-1</sup>  <u>Direction</u> 0° to 360°	-50° to 50°C
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## ULTRASONIC 3D WIND SENSORS

### CSAT3B | 3D Sonic

#### Anemometer

Best instrument for flux and other high-level turbulence research projects



Signal Type/Output	Measurement Description	Output Range	Operating Temperature
SDM, CPI, USB, RS-485	$u_x, u_y, u_z, c$	Full Scale Wind: $\pm 65 \text{ m s}^{-1}$	$-30^\circ$ to $50^\circ\text{C}$

## TEMPERATURE & RELATIVE HUMIDITY

### CS215-L | Reliable and

easy to maintain



Signal Type/Output	Measurement Description	Output Range	Operating Temperature
SDI-12	temperature relative humidity	<u>Temperature</u> $-40^\circ$ to $70^\circ\text{C}$ <u>Relative Humidity</u> 0 to 100%	$-40^\circ$ to $70^\circ\text{C}$

### 083E-L | Accurate

and reliable sensor



Signal Type/Output	Measurement Description	Output Range	Operating Temperature
analog voltage	temperature relative humidity	<u>Temperature</u> $-50^\circ$ to $50^\circ\text{C}$ <u>Relative Humidity</u> 0 to 100%	$-50^\circ$ to $50^\circ\text{C}$

### EE181-L | Accurate

and rugged



Signal Type/Output	Measurement Description	Output Range	Operating Temperature
analog voltage	temperature relative humidity	<u>Temperature</u> $-40^\circ$ to $60^\circ\text{C}$ <u>Relative Humidity</u> 0 to 100%	$-40^\circ$ to $60^\circ\text{C}$

## BAROMETRIC PRESSURE SENSORS

### CS100 (Setra 278) |

Standard Barometer

Reliable and accurate



Signal Type/Output	Measurement Description	Output Range	Operating Temperature
analog voltage	barometric pressure	600 to 1100 mb <sup>b</sup>	$-40^\circ$ to $60^\circ\text{C}$

### 092-L | Includes Weather-

proof Enclosure

Reliable and accurate



Signal Type/Output	Measurement Description	Output Range	Operating Temperature
analog voltage	barometric pressure	600 to 1100 mb	$-40^\circ$ to $55^\circ\text{C}$

## VERTICAL WIND SENSORS

### 27106T-L | Low threshold

precision vertical wind sensor



Signal Type/Output	Measurement Description	Output Range	Operating Temperature
analog voltage	vertical wind speed	0 to $40 \text{ m s}^{-1}$	$-50^\circ$ to $50^\circ\text{C}$

## DELTA TEMPERATURE

**43347-L** | Highly accurate RTD for atmospheric stability monitoring  $\pm 0.1^\circ\text{C}$  accuracy with NIST calibration



**43502-L** | Aspirated Shield, provides more accurate measurement

	Signal Type/Output	Measurement Description	Output Range	Operating Temperature
	analog voltage	temperature	$\pm 50^\circ\text{C}$	$\pm 50^\circ\text{C}$
	NA	Delta T: $< 0.05^\circ\text{C}$ RMS with like shields	5 to 11 $\text{m s}^{-1}$	$-50^\circ$ to $60^\circ\text{C}$

## OTHER

**0871LH1** | Freezing Rain Detector



**LWS-L** | Surface Wetness Sensor  
Dielectric sensor to determine presence of water and ice



**CS120** | Visibility Sensor  
High Performance Visibility Measurements



**CS135** | LIDAR Ceilometer  
Sensitive, Long Range Cloud Measurement



**CS47X-L** | Radar Water Level Sensor  
FCC Approved



**ZephIR 300** | Remote Sensing Lidar  
Accurate and reliable



	Signal Type/Output	Measurement Description	Output Range	Operating Temperature
	RS-485	ice detected/ no ice detected	state dependent, ICE = 1 NO ICE = 0	$-51^\circ$ to $71^\circ\text{C}$
	analog voltage	dry, frosted, wet	250 mV to 1500 mV, millivolt reading relates to moisture state	$-20^\circ$ to $60^\circ\text{C}$
	RS-232, RS-485	Meteorological Observable Range (MOR)	12 m to 32 km	$-25^\circ$ to $60^\circ\text{C}$
	RS-232, RS-485	cloud height and vertical visibility	5 m to 10 km: Up to four cloud layers reported	$-40^\circ$ to $60^\circ\text{C}$
	SDI-12	distance	50 mm to 70 m	$-40^\circ$ to $80^\circ\text{C}$
	cellular, Modbus	wind speed, wind direction, turbulence intensity, wind shear, wind veer	Up to 10 program- mable measure- ment heights from 10 m to 300 m	$-40^\circ$ to $50^\circ\text{C}$

### NOTES:

<sup>a</sup>Item is special ordered and cabled by Campbell Scientific.

<sup>b</sup>The CS100 is available in special ranges of 500 to 1100 and 800 to 1110; contact Campbell Scientific for more information.



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