pacific data systems

Solutions. **Technology.** Simple.

PDS-WX-3
Ultrasonic Weather Sensor

- **Suitable for moving vehicle applications**

- **Removable and field-servicable humidity sensor**

- **True wind speed & direction**

- **50% reduction in current draw for solar and battery powered use**

- **Output options include RS232, RS422 and CAN BUS (NMEA2000)**

- **WeatherCaster™ PC software for viewing and customising data sentences**

Reliability and superior accuracy, along with no moving parts and plug and play installation, makes the PDS WX-3 an easy and affordable choice for any weather solution.

The new PDS-WX-3 Weather Sensor offers ultrasonic true wind speed and direction measurement as well as barometric pressure, air temperature, humidity and wind chill temperature.

The ability to provide true wind speed and direction readings makes it a suitable weather sensor for use in moving vehicle applications (e.g. farm machinery, emergency service vehicles, marine vehicles). Also included is a 10Hz GPS, solid state compass and three-axis accelerometer for pitch and roll to assist in navigation, particularly for marine vessels.

The PDS WX-3 has also been developed with a 50% reduction in current draw for use in remote locations where solar or battery power is in use. Pacific Data Systems can design and build complete weather stations incorporating the PDS-WX-3 Ultrasonic Weather Sensor to meet your project requirements.

Features

- Ultrasonic wind readings up to 40 m/s
- True wind speed and direction
- Barometric pressure
- Air temperature
- Calculated wind chill temperature
- Relative humidity
- Dewpoint
- Heat index

- 10 Hz GPS (COG/SOG/Position)
- Two-axis solid state compass
- Three-axis accelerometer for pitch and roll
- Output options include NMEA 0183 (RS422 / NMEA 2000® (CAN BUS), NMEA 0183 (RS232)

Technical Specifications

Wind Speed Range:	0 m/s to 40 m/s (0 MPH to 92 MPH)
Wind Speed Resolution:	0.1 m/s (0.1 MPH)
Wind Speed Accuracy @ 0°C to 55°C (32°F to 131°F),no precipitation*:	
	- Low Wind Speeds: 0 m/s to 5 m/s; RMS error of 0.5 m/s +10% of reading
	- High Wind Speeds: 5 m/s to 40 m/s 1; RMS error of 1 m/s (2.3 MPH) or 5% RMS, whichever is greater
Wind Speed Accuracy in wet conditions:**	2.5 m/s (5.7 MPH) RMS
Wind Direction Range:	0° to 360°
Wind Direction Resolution:	0.1°
Wind Direction Accuracy @ 0°C to 55°C (32°F to 131°F), no precipitation*:	
	- Low Wind Speeds: 2 m/s to 5 m/s - 5° RMS typical
	- High Wind Speeds: >5 m/s - 2° RMS typical
Wind Direction Accuracy in wet conditions:**	>4 m/s (9.2 MPH)—8° RMS typical
Compass Accuracy:	1° RMS when level
Pitch and Roll Range / Accuracy:	±50° / <1° static tested @ 25°C (77°F)
Air Temperature Range:	-25°C to 55°C (-13°F to 131°F)
Air Temperature Resolution:	0.1°C (0.1°F)
Air Temperature Accuracy:	±1°C (±1.8°F)* @ >4 knots (>4.6 MPH) wind
Barometric Pressure Range:	850 mbar to 1150 mbar (25 inHg to 34 inHg, 850 hPa to 1150 hPa)
Barometric Pressure Resolution:	0.1 mbar (0.029 inHg, 0.1 hPa)
Barometric Pressure Accuracy:	±2 mbar (±0.059 inHg, ±2 hPa) when altitude correction is available
Relative Humidity Range:	10% to 95% RH
Relative Humidity Accuracy*:	±4% units RH
GPS Position Accuracy:	3 m with WAAS/EGNOS (95% of the time, SA off)
Operating Temperature Range:	-25°C to 55°C (-13°F to 131°F)
Supply Voltage:	9 VDC to 16 VDC
Supply Current:	<80 mA @ 12 VDC
Weight:	285 grams
Sensor Baud Rate (RS422 with NMEA 0183 Interface Only):	4,800 bps (can be increased to 38,400 bps with a command)
Thread Sizes on Base:	1-14" UNS or 3/4" NPT
Certifications and Standards:	CE, RoHS

Sensor Provides

Apparent and True Wind Speed and Direction
Readings come from the ultrasonic anemometer

Air Temperature
Based on a negative temperature coefficient thermistor that measures the ambient air temperature

Relative Humidity
Measured with a capacitive cell humidity sensor

Barometric Pressure
Measured using a temperature-compensated silicon piezoresistive pressure sensor corrected to equivalent sea level pressure based on attitude named by GPS

Heat Index
Based on air temperature and relative humidity

Wind Chill
Based on wind speed and air temperature

Magnetic Compass Heading
Two-axis magneto-inductive sensors

Pitch and Roll Angles
Three-axis MEMS accelerometer

Position, Speed, Time, and Course Over Ground
Global Positioning System (GPS) receiver

Materials

White Housing	GE® Geloy®
Metal Plate	Anodized Aluminum
Wind Channel	Dupont® Delrin™

RMS - Root Mean Square, LEN - Load Equivalency Number

Humidity and temperature readings compared to Vaisala® Instruments

* When the wind speed is less than 2 m/s (4.6 MPH) and/or air temperature is below 0°C (32°F), wind, temperature, and relative humidity readings will be less accurate.

** Wet conditions include moisture, rain, frost, dew, snow, ice and/or sea spray in the wind channel.

Data Output Protocol

*RS422/NMEA 0183 Sentence Structure**

$GPDTM	Datum Reference
$GPGGA	GPS Fix Data
$GPGLL	Geographic Position - Latitude and Longitude
$GPGSA	GNSS DOP and Active Satellite
$GPGSV	Satellites in View
$GPRMC	Recommended Minimum GNSS
$GPVTG	COG and SOG
$GPZDA	Time and Date
$HCHDG	Heading, Deviation, and Variation
$WIMDA	Meteorological Composite
$WIMWD	Wind Direction and Speed
$WIMWV	Wind Speed and Angle
$WIMWR	Relative Wind Direction and Speed
$WIMWT	True Wind Direction and Speed
$YXXDR	Transducer Measurements

*Additional data available from the WeatherStation® Instrument