

PB200



Integrated Sensors Provide a Mini-Network

The PB200 WeatherStation instrument informs you of instantaneous changes in the weather. Wind Speed and Direction are measured using four ultrasonic transducers. No moving parts results in better durability and reliability. The internal WAAS/EGNOS GPS engine and three-axis solid-state compass make it possible for the PB200 to provide both Apparent and True Wind Speed and Direction without the need to add additional sensors. The WAAS/EGNOS GPS provides navigation data as well as magnetic variation and is suitable as your primary GPS source. The internal temperature and barometric pressure sensors help predict changing weather patterns. Combined with the internal heading sensor, most of your navigation needs are provided! No other sensor on the market incorporates all of these features in one compact housing.

Unsurpassed Heading

What sets us apart from the competition and the original PB100 is the ability to provide 2° heading accuracy under dynamic conditions, such as rough seas. Airmar's unique dynamic motion correction software is the key difference. The PB200's heading is highly accurate and stable under most sea conditions—even if the vessel is pitching and rolling up to 30° in rough seas. Also unique to the PB200 is that the 3D accelerometer and rate gyro are temperature compensated, resulting in precise tilt and rate of turn data. This allows the PB200 to accurately measure True Wind Speed and Direction even when tilted up to 30°.



Sensing Technology

Ultrasonic

WeatherStation[®] Instrument

Features

- True wind speed and direction
- Apparent wind speed and direction
- Barometric pressure
- Air temperature
- Wind chill temperature
- Measures wind speed and direction ultrasonically
- Wind calibration traceable to NIST
- Internal WAAS/EGNOS GPS
- Three-axis solid-state compass
- Three-axis accelerometer provides stabilized pitch and roll information in dynamic conditions
- Better than 1° compass accuracy in static conditions
- Best-in-class 2° compass accuracy in dynamic condition
- Yaw rate gyro provides rate of turn data
- Outputs both NMEA 0183 and NMEA 2000[®] data
- Plastic housing is less prone to lightning strikes
- WeatherCaster[™] Software
- Very easy installation and two-year warranty
- Maintenance-free operation—no moving parts
- Recommended for large powerboats and commercial vessels

www.airmar.com

PB200 Ultrasonic WeatherStation® Instrument

How the WeatherStation® Instrument Works

The Airmar WeatherStation Instrument is the only all-in-one weather sensor that calculates apparent wind speed and direction, barometric pressure, air temperature, and wind chill temperature. With the internal compass and WAAS/EGNOS GPS, true wind speed and direction can also be calculated. The UV stabilized, compact housing is fully waterproof and resistant to sunlight and chemicals.

The ultrasonic wind sensor (an ultrasonic anemometer) measures apparent wind speed and direction. The WeatherStation Instrument contains four ultrasonic transducers, visible through the four holes in the top of the sensor's wind channel (see figure 1). These transducers operate in pairs—one transducer injects a pulse into the air. The pulse bounces off the metal plate at the bottom of the wind channel and is carried by the wind to arrive at the listening transducer a short time later.

When there is no wind, the pulse travels at the speed of sound from the sender to the receiver. Whenever the wind is blowing in that direction, the pulse will arrive sooner than if the air is still. Similarly, whenever the wind is blowing in the opposite direction, the pulse will arrive later than if the air is still. The four transducers take turns in sending and receiving pulses.

A microprocessor within the WeatherStation Instrument then combines the measurements from all four transducers to calculate the resultant wind speed and direction. Throughout this process, the sensor monitors the air temperature, to compensate for the fact that the speed of sound in air changes with temperature.



Figure 1

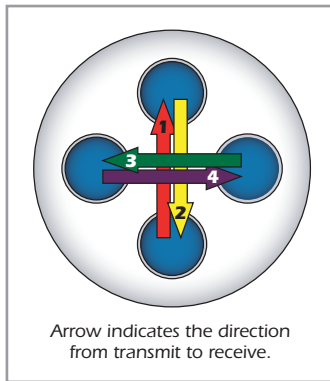


Figure 2

Understanding True and Apparent Wind

The WeatherStation Instrument has the unique ability to display both true and apparent wind. True wind is the actual motion of the air relative to the earth. Apparent wind is the wind which an observer experiences while moving or on board a boat. It is the result of two motions—the actual motion of the air (the true wind) and the motion of the boat. If the vessel is not moving, then the true and apparent wind will be the same.

Enhanced Performance

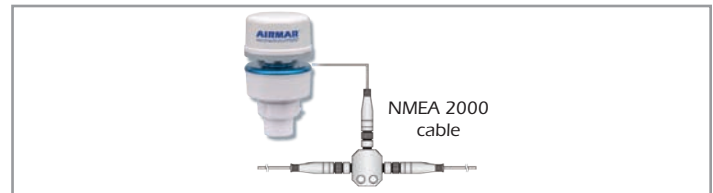
The Airmar PB200 WeatherStation Instrument offers enhanced performance over the PB100 and the competition. Advanced features such as a three-axis solid-state compass, three axis accelerometer, yaw rate gyro and WAAS/EGNOS GPS result in unsurpassed performance under all sea conditions. The sensor can also be fully integrated with your existing NMEA 0183 electronics or NMEA 2000 network. Unique to the sensor is its ability to output both NMEA 0183 and NMEA 2000 simultaneously to various devices on-board. Coupled with Airmar's intuitive WeatherCaster PC software, the PB200 is also a powerful stand alone solution.

The WeatherStation Instrument comes with our intuitive WeatherCaster™ Software. Data can be viewed in both digital and analog format and can be saved for a set period of time. The log time can be adjusted in intervals from 6 to 72 hours. Standard NMEA sentences and an RS485 interface allows for the flexibility of designing your own software program to fit your specific application. Our comprehensive technical manual makes the job easy!

Airmar's WeatherStation Instrument includes a standard 1-14" UNS marine thread connections to accommodate standard mounting hardware. The waterproof base connector assures trouble-free installation and servicing, while a quick disconnect feature allows for installations on vessels of all types and sizes.

Connecting the PB200 to a NMEA 2000® Network

When connecting the PB200 WeatherStation® Instrument to a NMEA 2000 network backbone, a devicenet cable is needed.



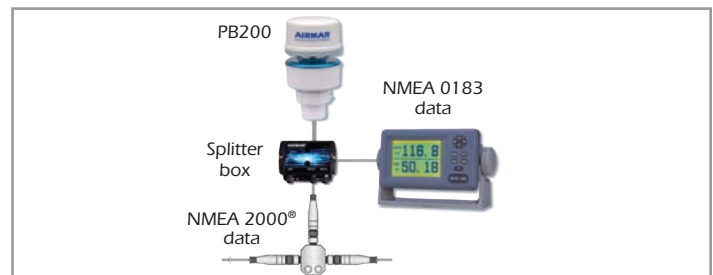
Connecting the PB200 to a PC—

When connecting the PB200 to a PC only, a USB Converter is required to use the WeatherCaster™ PC Software.

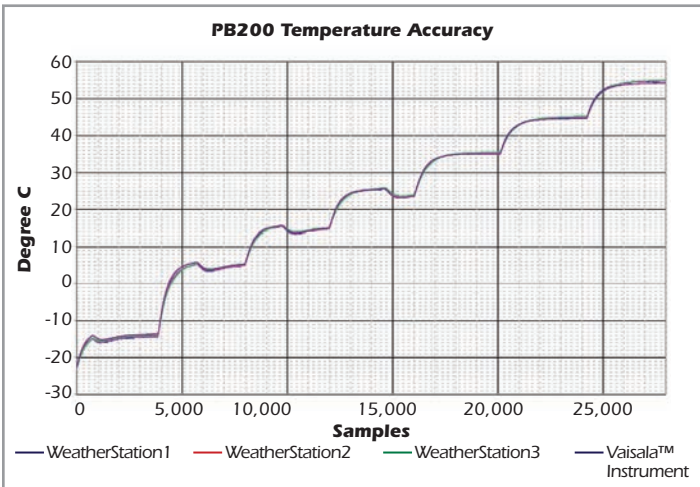
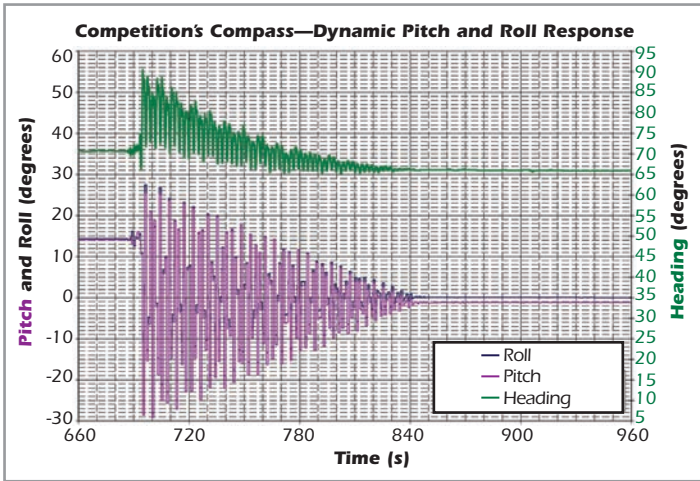
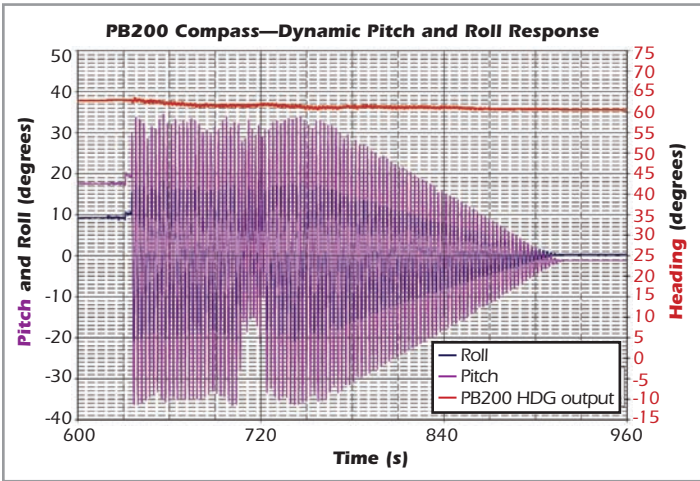
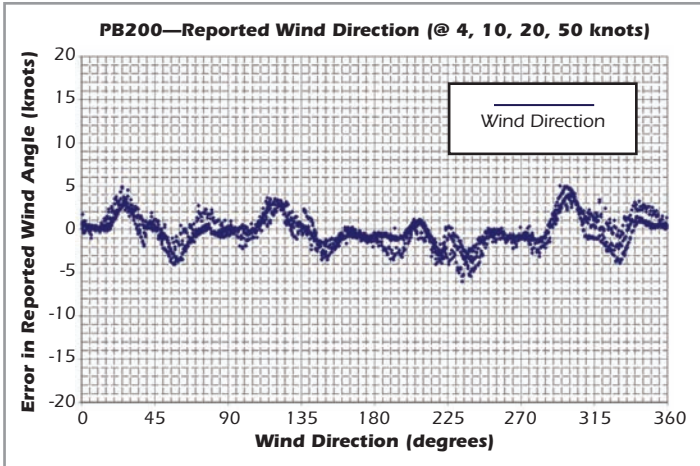
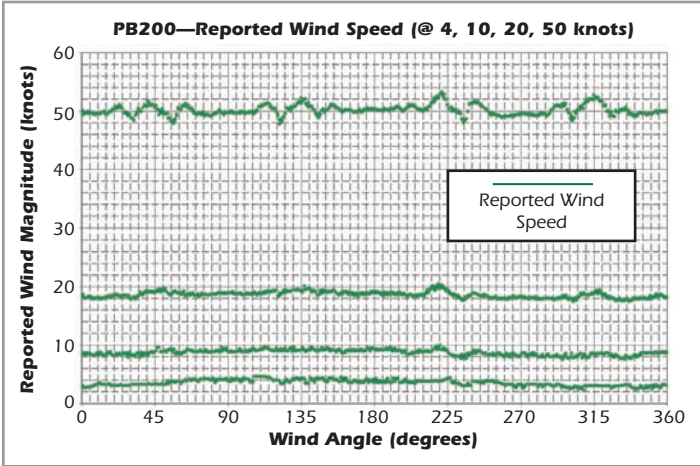


Connecting the PB200 to a NMEA 0183 and NMEA 2000® Networks

When simultaneously connecting the PB200 to both NMEA 0183 and NMEA 2000 networks, a combination cable kit is required. This kit contains either a 15 m (50') or 30 m (100') combination cable, splitter box, 3M connectors, and a 6 m (20') devicenet cable for connecting to the NMEA 2000 network.



PB200 Performance Accuracy and Graphs

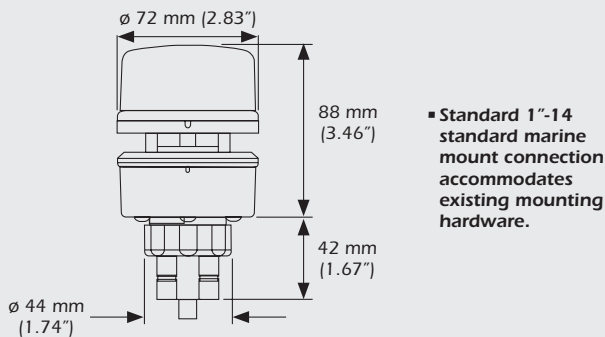


State-of-the-Art Wind Tunnel
 Every Airmar® WeatherStation® Instrument's wind measurements are calibrated in the on-site wind tunnel, which is traceable to National Institute of Standards and Technology (NIST) Standard Reference Material.



Technical Information

DIMENSIONS



SPECIFICATIONS

Wind Speed Range: 0 knots to 80 knots (0 MPH to 92 MPH)
Wind Speed Resolution: 0.1 knots (0.1 MPH)
Wind Speed Accuracy @ 0°C to 55°C (32°F to 131°F), no precipitation*:
 — Low Wind Speeds: 0 knots to 10 knots (0 MPH to 11.5 MPH); ± 1 knot (1.1 MPH) +10% of reading
 — High Wind Speeds: 10 knots to 80 knots (11.5 MPH to 92 MPH); ± 2 knots (2.3 MPH) or 5% RMS, whichever is greater
Wind Speed Accuracy in wet conditions:** 5 knots (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: 4 knots to 10 knots (4.6 MPH to 11.5 MPH)—6° RMS typical
 — High Wind Speeds: >10 knots (>11.5 MPH)—3° RMS typical
Wind Direction Accuracy in wet conditions:**
 >8 knots (9.2 MPH)—8° RMS typical
Compass Accuracy:
 —1° RMS when level
 —2° RMS for pitch and roll angles up to 30°
 —3° RMS for pitch and roll angles up to 45°
Pitch and Roll Range/Accuracy: $\pm 50^\circ$ / $< 1^\circ$
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: $\pm 1^\circ\text{C}$ ($\pm 1.8^\circ\text{F}$)* @ >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: 1.1 mbar (0.032 inHg, 1.1 hPa)
Barometric Pressure Accuracy: ± 20 mbar (± 0.59 inHg, ± 20 hPa) when altitude correction is available
GPS Position Accuracy: 3 m (10') 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: <220 mA
Weight: 285 grams (0.7 lb)
Sensor Baud Rate (NMEA 0183 Only): 4,800 bps (can be increased to 38,400 bps with a command)
NMEA 2000® Load Equivalency Number (LEN): 5
Thread Sizes on Base: 1"-14 UNS standard marine mount
Certifications and Standards: CE, IPX6, RoHS, IEC60945

DATA OUTPUT PROTOCOL

NMEA 0183 Sentence Structure

\$GPDTMDatum Reference
\$GPGGAGPS Fix Data
\$GPGLLGeographic Position—Latitude and Longitude
\$GPGSAGNSS DOP and Active Satellite
\$GPGSVSatellites in View
\$GPRMCRecommended Minimum GNSS
\$GPVTGCOG and SOG
\$GPZDATime and Date
\$HCHDGHeading, Deviation, and Variation
\$HCHDTTrue Heading
\$TIROTRate of Turn
\$WIMDAMeteorological Composite
\$WIMWDWind Direction and Speed
\$WIMWVWind Speed and Angle
\$WIMWRRelative Wind Direction and Speed
\$WIMWTTrue Wind Direction and Speed
\$YXXDRTransducer Measurements

NMEA 2000® Supported PGNs

59392ISO Acknowledgement
060928ISO Address Claim
126208Acknowledge Group Function
126464PGN List
126992System Time
126996Product Information
126998Configuration Information
127250Vessel Heading
127251Rate of Turn
127257Attitude
127258Magnetic Variation
129025Position and Rapid Update
129026COG and SOG, Rapid Update
129029GNSS Position Data
129033Time and Date
129044Datum
129538GNSS Control Status
129539GNSS DOPs
129540GNSS Sats in View
130306Wind Data
130310Environmental Parameters
130311Environmental Parameters
130323Meteorological Station Data

RMS—Root Mean Square, LEN—Load Equivalency Number

*When the wind speed is less than 4 knots (4.6 MPH) and/or air temperature is below 0°C (32°F), wind and temperature readings will be less accurate.

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