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°.

AIRMAR® TECHNOLOGY CORPORATION
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
- Internal WAAS/EGNOS GPS
- Three-axis solid-state compass
- Three-axis accelerometer provides stabilized pitch and roll information in dynamic conditions
- Better than 1° static compass accuracy
- Best-in-class 2° dynamic compass accuracy
- 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
- 360° calibration results in precise wind direction accuracy
- Very easy installation and two-year warranty
- Maintenance-free operation—no moving parts
- Recommended for large powerboats and commercial vessels

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.

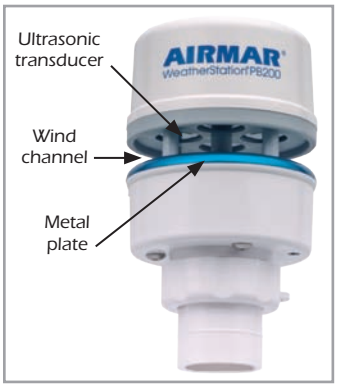


Figure 1

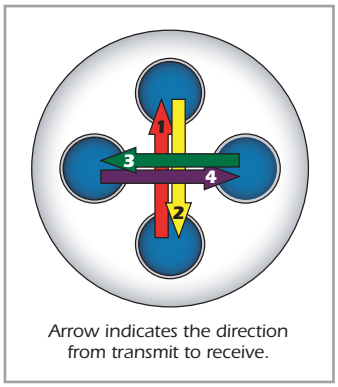


Figure 2

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.

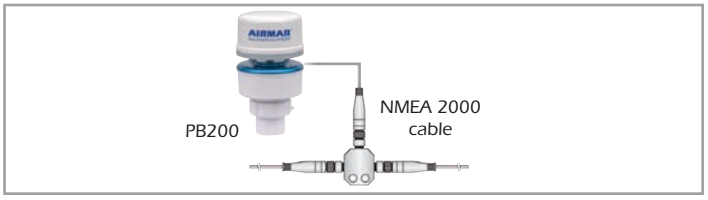
Enhanced Performance

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.

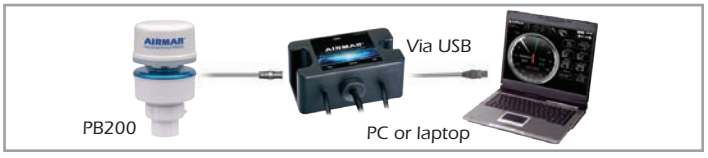
The WeatherStation Instrument comes with our intuitive WeatherCaster™ Software. Data can be viewed in both digital and analog format and can be saved for a set period of time. The log time can be adjusted in intervals from 6 to 72 hours. Standard NMEA sentences and an RS485 interface allows for the flexibility 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.

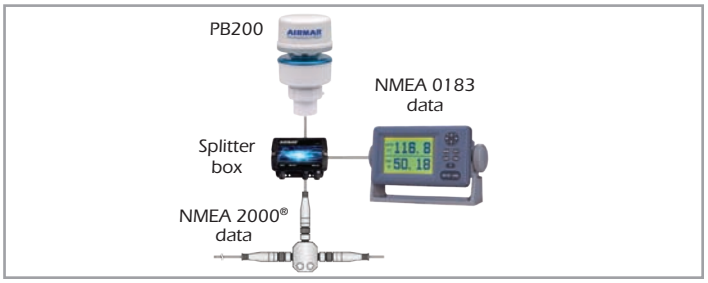
Connecting the PB200 to a NMEA 2000® Network
When connecting the PB200 WeatherStation® Instrument to a NMEA 2000 network backbone, a devicenet cable is needed.



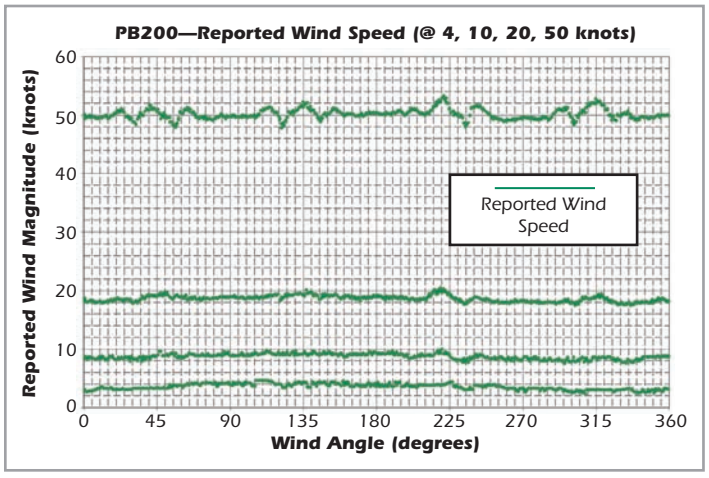
Connecting the PB200 to a PC—
When connecting the PB200 to a PC only, a USB Converter is required to use the WeatherCaster™ PC Software.

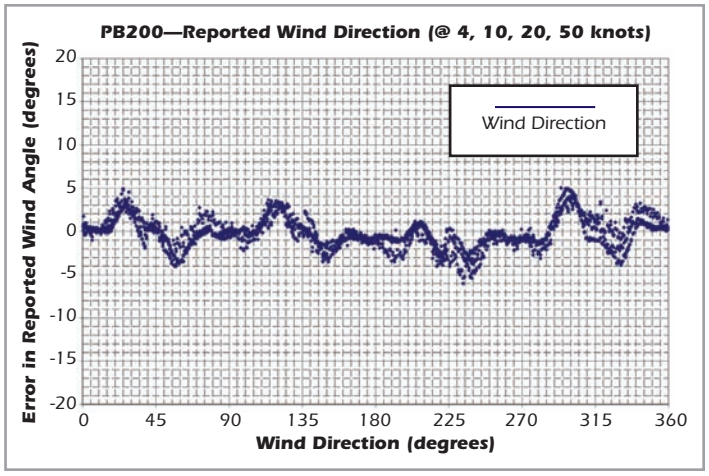


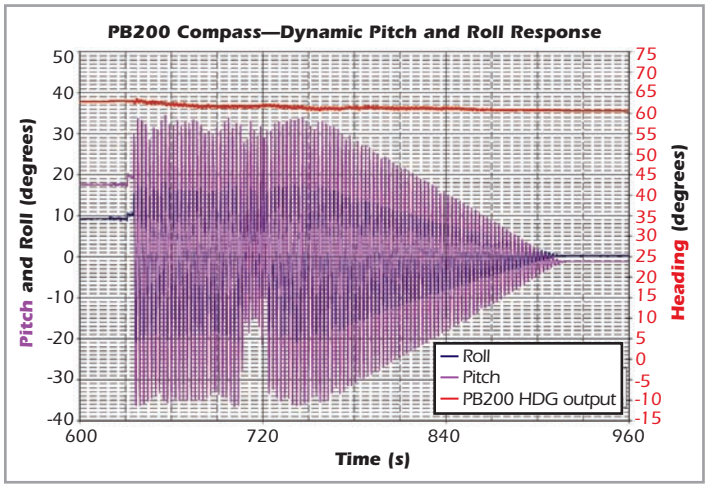
Connecting the PB200 to a NMEA 0183 and NMEA 2000® Networks
When simultaneously connecting the PB200 to both NMEA 0183 and NMEA 2000 networks, a combination cable kit is required. This kit contains either a 15 m (50') or 30 m (100') combination cable, splitter box, 3M connectors, and a 6 m (20') devicenet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

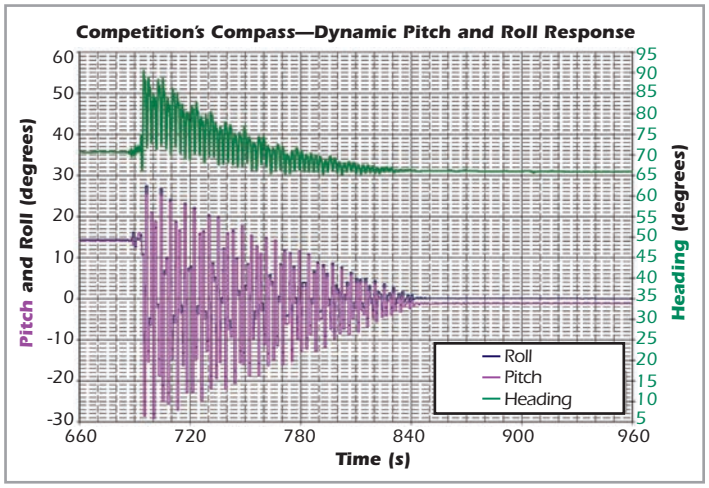


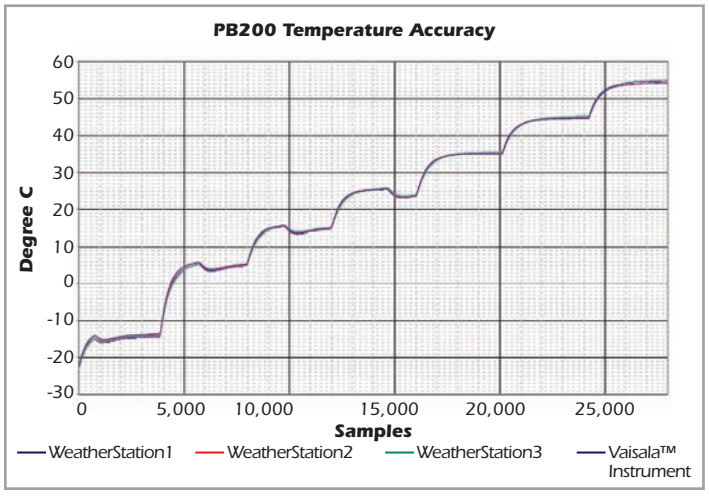
PB200 Performance Accuracy and Graphs









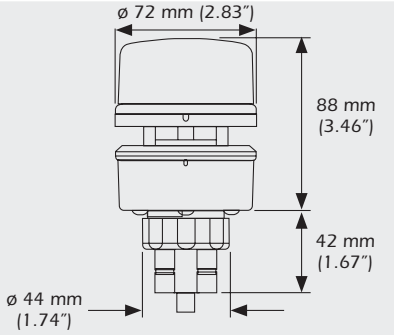


State-of-the-Art Wind Tunnel
Airmar's on-site wind tunnel is calibrated with a pitot tube, which in turn was calibrated with a National Institute of Standards and Technology (NIST) traceable pitot tube.

PB200

Technical Information

DIMENSIONS



- **Standard 1"-14 standard marine mount connection accommodates existing mounting hardware.**
- **NMEA 2000® cables longer than 6 m (20') have a molded in terminating resistor**

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); RMS error of 1 knot (1.1 MPH) +10% of reading
— High Wind Speeds: 10 knots to 80 knots (11.5 MPH to 92 MPH); RMS error of 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)—5° RMS typical
— High Wind Speeds: >10 knots (>11.5 MPH)—2° RMS typical
Wind Direction Accuracy in wet conditions:**
>8 knots (9.2 MPH)—8° RMS typical
Compass Accuracy:
—1° static heading accuracy
—2° dynamic heading accuracy
Rate-of-Turn: 0° to 70° per second
Rate-of-Turn Accuracy: 1° per second
Rate-of-Turn Data Output Update Rate:
— 2 Hz—NMEA 0183 (Adjustable up to 10 Hz)
— Adjustable up to 20 Hz—NMEA 2000
Pitch and Roll Range/Accuracy: ±50° / <1°
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
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 Interface 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, NMEA 2000®, IEC61000-4-2, IEC60945

DATA OUTPUT PROTOCOL

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
$HCHDT .....True Heading
$TIROT.....Rate of Turn
$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

NMEA 2000® Supported PGNs
59392.....ISO Acknowledgement
060928....ISO Address Claim
126208....Acknowledge Group Function
126464....PGN List
126992....System Time
126996....Product Information
126998....Configuration Information
127250....Vessel Heading
127251....Rate of Turn
127257....Attitude
127258....Magnetic Variation
129025....Position and Rapid Update
129026....COG and SOG, Rapid Update
129029....GNSS Position Data
129033....Time and Date
129044....Datum
129538....GNSS Control Status
129539....GNSS DOPs
129540....GNSS Sats in View
130306....Wind Data
130310....Environmental Parameters
130311....Environmental Parameters
130323....Meteorological 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.

AIRMAR® TECHNOLOGY CORPORATION
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RoHS COMPLIANT

ISO CERTIFIED CE