

# PB200

## Technical Information

### 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 (32°F to 131°F), @ 0°C to 55°C no precipitation*	1 knot (1.1 MPH) +10% of reading RMS from 0 knots to 10 knots (0 MPH to 11.5 MPH); 2 knots (2.3 MPH) or 4% of reading RMS from 10 knots to 80 knots (11.5 MPH to 92 MPH), 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*	6° RMS typical from 4 knots to 10 knots (4.6 MPH to 11.5 MPH); 3° RMS typical for >10 knots (>11.5 MPH)
Wind Direction Accuracy in wet conditions**	8° RMS typical for >8 knots (9.2 MPH)
Compass Accuracy— Static Heading no Magnetic Interference	1° RMS when level 2° RMS for pitch and roll angles up to 30° 3° RMS for pitch and roll angles up to 45°
Compass Accuracy— Dynamic Conditions	2° RMS or pitch and roll angles up to 30°
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 hPa to 1150 hPa (850 mbar to 1150 mbar, 25 inHg to 34 inHg)
Barometric Pressure Accuracy	±20 hPa (±20 mbar, ±0.59 inHg) when altitude correction is available
Operating Temperature Range	-25°C to 55°C (-13°F to 131°F)
Supply Voltage	9 VDC to 16 VDC
Weight	285 grams (0.7 lb)
Supply Current	<200 mA
Sensor Baud Rate (NMEA 0183 only)	4800 bps (can be increased to 38,400 bps with a command)
NMEA 2000® LEN	13
Thread Sizes on Base	1"-14 standard marine mount
Certifications and Standards	CE, IPX6, RoHS, IEC 60945

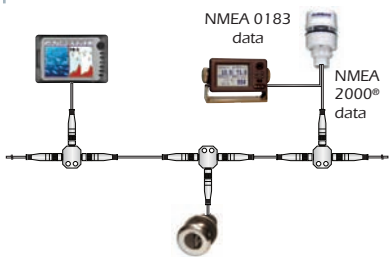
RMS—Root Mean Square, LEN—Load Equivalency Number

\*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.

Humidity and temperature compared to Vaisala™ Instruments

### PB200 Network Configuration



Software updates are available on Airmar's website: [www.airmar.com](http://www.airmar.com)

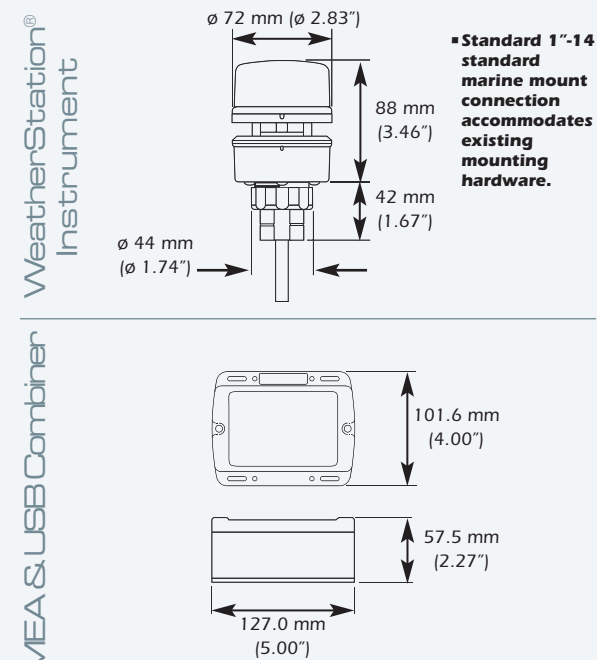
### WeatherCaster™ Software



Set-up screen

## Ultrasonic WeatherStation® Instrument

### Dimensions



WeatherStation® Instrument

NMEA & USB Combiner

Standard 1"-14 marine mount connection accommodates existing mounting hardware.

### Data Output Protocol

#### NMEA 0183 Sentence Structure

SGPDTM ... Datum Reference	SHCHDG ... Heading, Deviation, and Variation
SGPGGA ... GPS Fix Data	SHCHDT ... True Heading
SGPGLL ... Geographic Position— Latitude and Longitude	STIROT ... Rate of Turn
SGPGSA ... GNSS DOP and Active Satellites	SWIMDA ... Meteorological Composite
SGPGSV ... Satellites in View	SWIMWD ... Wind Direction and Speed
SGPRMC ... Recommended Minimum GNSS	SWIMWV ... Wind Speed and Angle
SGPVTG ... COG and SOG	SWIVWR ... Relative Wind Direction and Speed
SGPZDA ... Time and Date	SWIVWT ... True Wind Direction and Speed
	SYXXDR ... Transducer Measurements

#### NMEA 2000® Output PGNs

059392 ISO Acknowledgement	129026 COG and SOG, Rapid Update
060928 ISO Address Claim	129029 GNSS Position Data
126208 Acknowledgement Group Function	129033 Time and Date
126464 PGN List	129044 Datum
126992 System Time	129538 GNSS Control Status
126996 Product Information	129539 GNSS DOPs
126998 Configuration Information	129540 GNSS Sats in View
127250 Vessel Heading	130306 Wind Data
127251 Rate of Turn	130310 Environmental Parameters
127257 Altitude	130311 Environmental Parameters
127258 Magnetic Variation	130323 Meteorological Station Data
129025 Position and Rapid Update	

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As Airmar constantly improves its products, all specifications are subject to change without notice. All Airmar products are designed to provide high levels of accuracy and reliability; however, they should only be used as aids to navigation and not as a replacement for traditional navigation aids and techniques.

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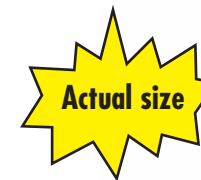
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# PB200

## Preliminary

## Ultrasonic WeatherStation® Instrument



## Your Complete Solution for Weather and Navigation.

### Integrated Sensors Provide a Mini-Network

The PB200 WeatherStation instrument informs you of instantaneous changes in the weather around you. Wind Speed and Direction are measured using four ultrasonic transducers. No moving parts results in better durability and reliability. The internal WAAS 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 on additional sensors. Additionally, the WAAS 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, all of your navigation needs are provided! No other sensor on the market incorporates all of these sensors in one compact housing.

### Unsurpassed Heading

What sets us apart from the PB100 and the competition 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°.

- True wind speed and direction
- Apparent wind speed and direction
- Barometric pressure
- Air temperature
- Wind chill temperature

- Three-axis, solid-state compass
- Better than 1° compass accuracy in static conditions
- Best-in-class 2° compass accuracy in dynamic conditions
- Three-axis accelerometer provides stabilized pitch and roll information in dynamic conditions
- Yaw rate gyro provides rate of turn data

- Measures wind speed and direction ultrasonically
- Wind calibration traceable to NIST
- Internal WAAS GPS
- WeatherCaster™ Software
- Outputs NMEA 0183 and NMEA 2000® data simultaneously
- Very easy installation
- Maintenance-free operation—no moving parts
- Two-year warranty



# PB200

## WeatherStation® Instrument

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 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

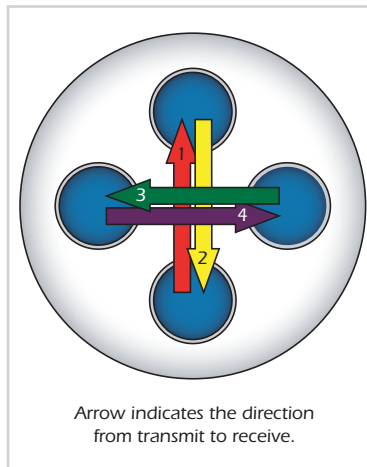


Figure 2

### 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

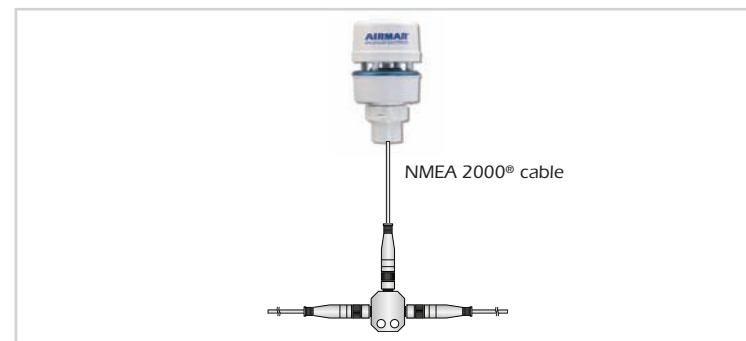
The Airmar PB200 WeatherStation Instrument offers enhanced performance over the PB100 and the competition. Advanced features such as a three-axis solid-state compass, three-axis accelerometer, yaw rate gyro and WAAS GPS result in unsurpassed performance under all sea conditions. The sensor can also be 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 standard devicenet cable is used.



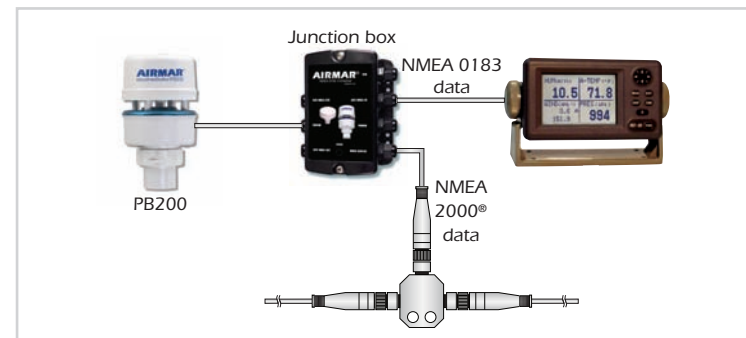
#### Connecting the PB200 to a PC

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

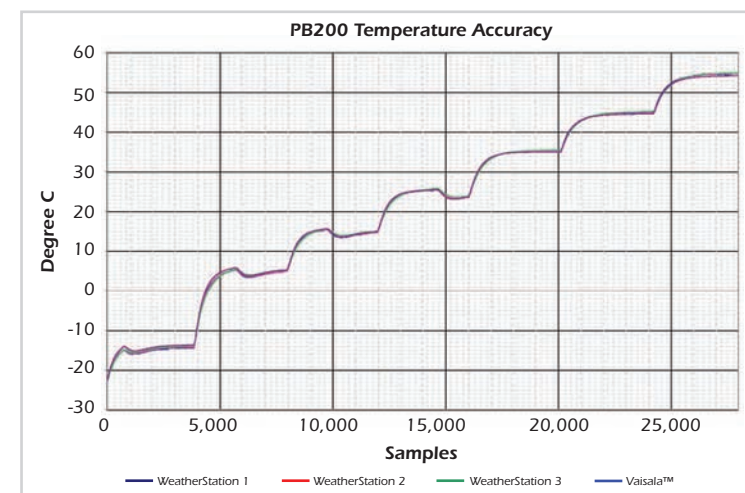
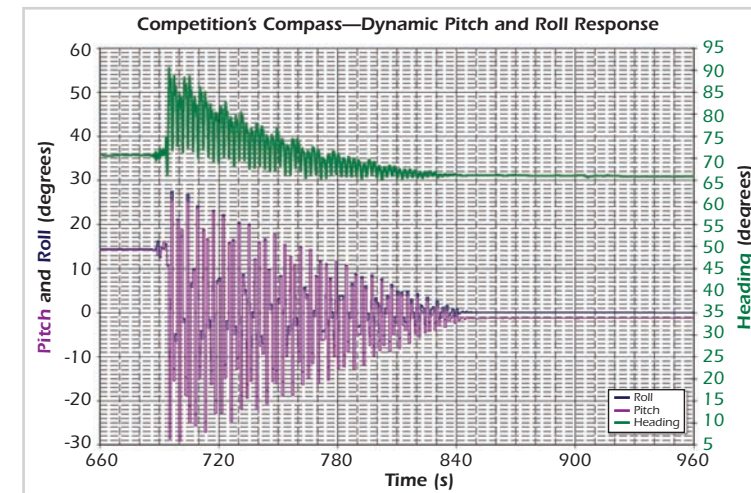
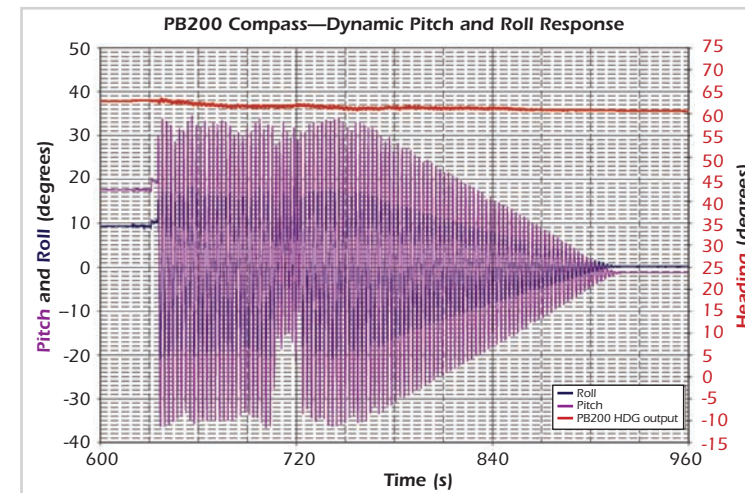
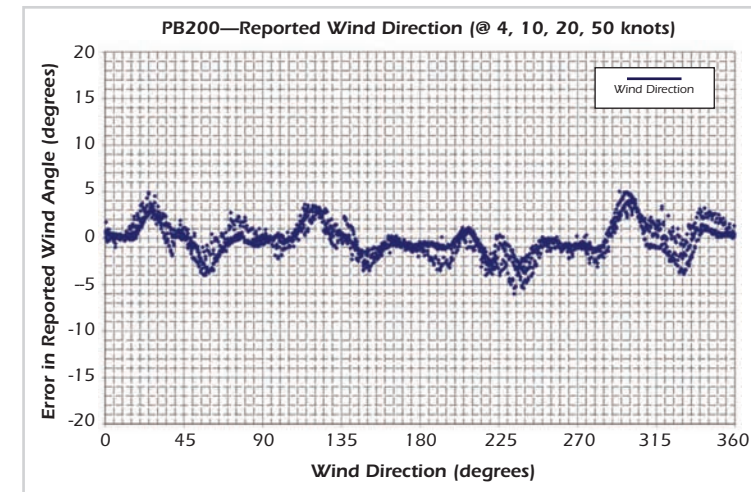
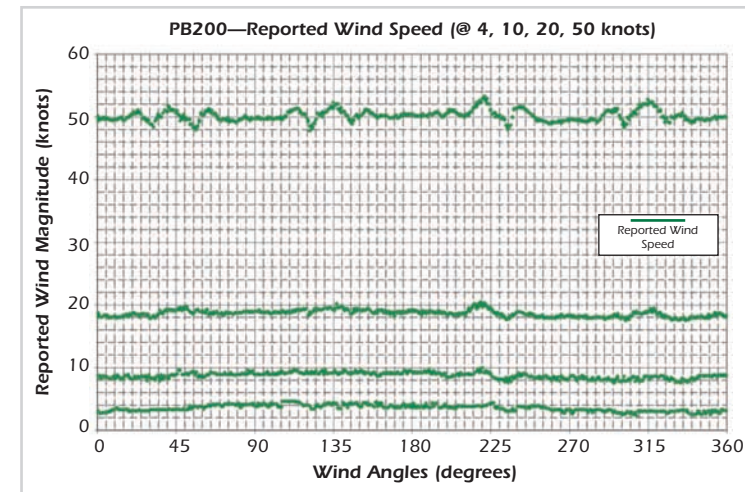
When simultaneously connecting the PB200 to both NMEA 0183 and NMEA 2000 networks, a combination cable kit is used. This kit includes: combination cable, junction box, and a 6 m (20') NMEA 2000 devicenet cable.



# PB200

## Performance Accuracy Graphs

Ultrasonic  
WeatherStation®  
Instrument



#### 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.