LB150 Ultrasonic WeatherStation® Instrument

Actual Size

Real-Time, Site-Specific Weather Information

The LB150 Ultrasonic WeatherStation® Instrument meets a growing need for real-time, site-specific weather information. The unit provides accurate data when monitoring weather conditions on-site or in remote locations.

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

- The only WeatherStation offering the perfect weather monitoring solution for any application by combining seven sensors into one compact unit with no moving parts.
- The lack of moving parts improves reliability, superior accuracy and longevity in the field.
- Other weather stations would take at least three separate sensors to achieve all of the weather readings in the LB150.
- Low-cost and easy-to-install on a standard pole with 1"-14 UNS or 3/4" NPT threads allowing for use as a fixed unit or portable system.
- WeatherStation's readings are not affected by the common problems associated with mechanical and weather measuring devices such as bearing wear, salt and dirt build-up and birds, all which can result in data inaccuracy or overall failure.
- Power and standard RS422 interface capabilities provided by a single cable (various lengths available).
- WeatherCaster PC software and USB converter provide a complete solution to connect directly to a PC.

Features

- No moving parts—maintenance-free operation
- True and apparent wind speed and direction
- Barometric pressure
- Air and wind chill temperature
- Heat index temperature
- Relative humidity
- Dew point temperature
- Internal GPS provides position (latitude and longitude), speed over ground (SOG), course over ground (COG), and time
- Two-axis solid-state compass provides heading
- Three-axis accelerometer provides pitch and roll
- Plastic housing is less prone to lightning strikes
- RS232 or RS422 output
- WeatherCaster™ PC Software included

Tan housing optional

AIRMAR® TECHNOLOGY CORPORATION
Sensing Technology

www.airmar.com

Applications

Agriculture

- Calculates real-time wind speed and direction to determine proper conditions for pesticide and fertilizer application.
- Compatible with greenhouse panels and irrigation systems allowing for automatic adjustments based on humidity and wind speed.

Airports

- Provides on-site wind and multi-panel weather readings for airports, helicopter pads and smaller scale landing strips.
- Remote capabilities assist air traffic controllers and pilots during vulnerable flight stages.

Environmental Monitoring / Meteorology

- Multi-panel sensors simultaneously calculate wind speed and direction, barometric pressure, air temperature, relative humidity, dew point, wind chill, and heat index.
- WeatherCaster PC Software provides a logging feature to monitor short and long-term weather patterns and trends.

Fire & Hazardous Response

- Remote access to portable tripod and vehicle mounts provide emergency response teams with live information en route to a disaster site as well as on location.
- Utilizes multiple sensors to determine potential contamination zones for areas surrounding disasters involving hazardous materials.

Highway / Road Conditions

- Easily mounts on existing meteorological towers along stat highways and roadways to monitor rapidly changing road conditions.
- Increases efficiency of motorist notifications and response time to rapidly changing road conditions.

Marine

- Provides 24-hour shipboard weather observations on vessels ranging in size from commercial ships to pleasure crafts and low occupancy vessels.
- Outputs real-time information by simultaneously collecting and measuring data through the use of high-speed sensors.

Military

- Provides multi-faceted weather monitoring for fields and surveillance operations, monitoring of satellite communications, and various intelligence applications.
- Internal controls allow user to easily manipulate information output by selecting desired applications resulting in ultimate precision when utilized on mobile units in land and water.

Nuclear Facilities / Renewable Energy Sources

- Monitors existing weather conditions allowing for increases response time to conditions that cause disastrous results and eventual meltdown.
- Withstands harsh conditions when installed near existing wind turbines and solar panels to monitor wind and other weather patterns.

Offshore Platforms & Docks

- Effectively monitors information to help determine safe working conditions for oil rigs and other offshore work sites.
- Ensures prompt and accurate data when assessing the feasibility of helicopter landings.

Structural Monitoring

- Monitors weather conditions to increase safety during construction of highly vulnerable structures such as cranes, bridges, and high-rise buildings.
- Provides site management staff with one compact and efficient unit to ensure compliance with safety requirements.

Utility Towers

- Mounts on wire towers to monitor high winds which can lead to wire sag or other detrimental situations.
- Reduces power outages by reducing response time to damage caused by unforeseen weather conditions.

Weather Buoys

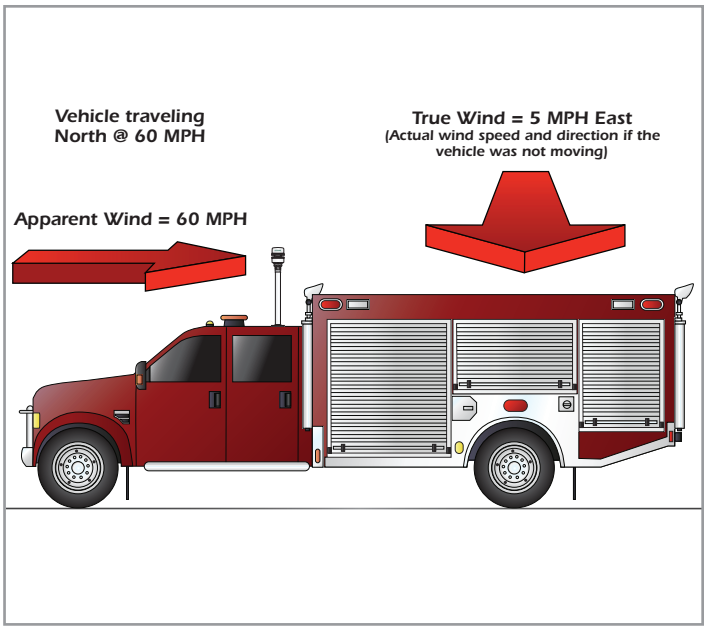
- Minimally invasive design easily mounts on offshore buoys with limited spatial requirements.
- Withstands pitching and rolling in heavy seas while providing real-time information to meteorologists as they predict ocean forecasting.

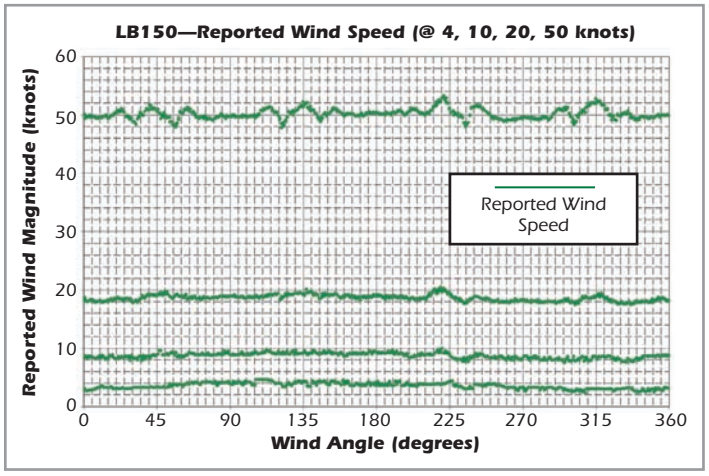
Performance Graphs Compared to Vaisala Instruments

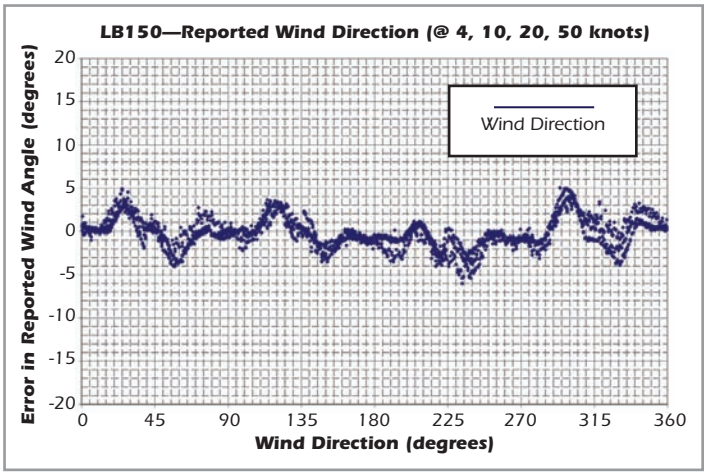
Understanding True and Apparent Wind

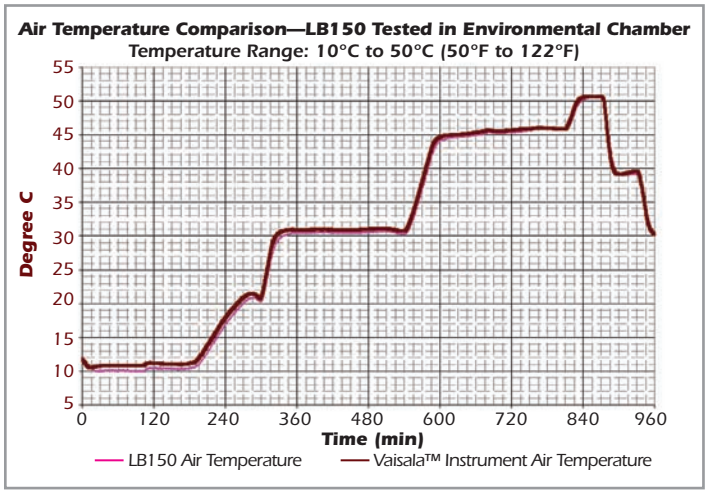
Virtually all mechanical and ultrasonic anemometers report apparent wind speed and direction. The Airmar LB150 is unique because it calculates both true and apparent wind speed & direction. These wind readings are the same if the unit is mounted in a fixed location. However, if the LB150 is mounted on a moving vehicle, the apparent wind is the wind you would feel on your hand if you held it out the window while going down the highway. Since the LB150 has a built in GPS and compass, it calculates the true wind based upon the apparent wind, speed of the vehicle, and compass heading.

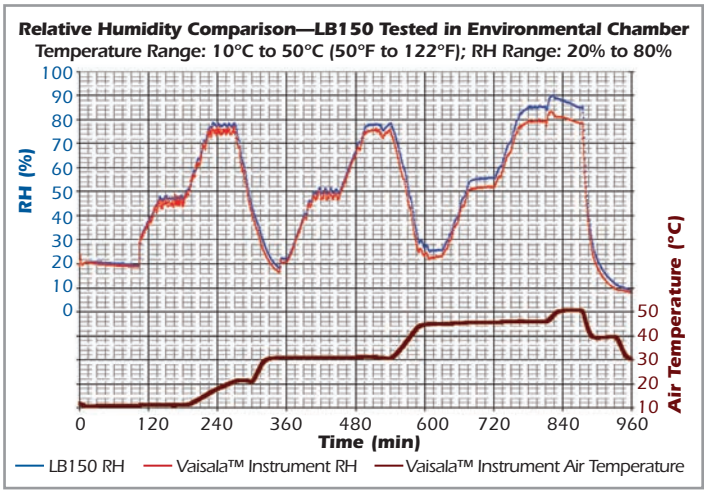
True wind information on hazardous response vehicles can prove to be valuable. When enroute to an emergency situation, responders can use the true wind readings to predict wind conditions at the disaster site before they even arrive, giving vital information for planning operations and staging apparatus.







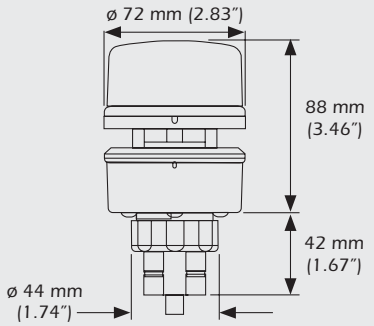




LB150

Technical Information

DIMENSIONS



▪ **Standard 1-14" UNS or 3/4" NPT mounting**

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 (0 MPH to 11.5 MPH); RMS error of 0.5 m/s (1.1 MPH) +10% of reading
— High Wind Speeds: 5 m/s to 40 m/s (11.5 MPH to 92 MPH); 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 (4.6 MPH to 11.5 MPH)—5° RMS typical
— High Wind Speeds: >5 m/s (>11.5 MPH)—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:
300 mbar to 1100 mbar (8.86 inHg to 32.48 inHg, 300 hPa to 1100 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 (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: <150 mA

Weight: 285 grams (0.7 lb)

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

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

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.

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Sensing Technology

RoHS COMPLIANT

ISO CERTIFIED CE

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