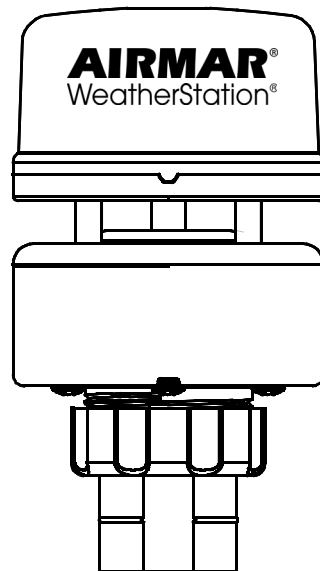




## Owner's Guide & Installation Instructions

# *Ultrasonic: Smart™ Sensor* WeatherStation® Instrument



Patent <http://www.airmar.com/patent.html>

### Land Models:

**110WX**  
**110WXS**  
**120WXH**  
**150WX**  
**150WXRS**  
**150WXS**  
**200WX**  
**220WXH**

### Marine Models:

**120WX**  
**120WXH**  
**220WX**  
**220WXH**

### Off-shore Model:

**200WX-IPX7**

Record the serial number found on the underside of the WeatherStation® Instrument.

Serial No. \_\_\_\_\_ Date of Purchase \_\_\_\_\_

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## **IMPORTANT**

**Please read the Owner's Guide completely  
before proceeding.**

### **Introduction**

Thank you for purchasing Airmar's ultrasonic, WeatherStation Instrument. This exciting product has multiple sensors in a single unit—without any moving parts. The compact housing is waterproof with a single removable cable. Functions and features vary by model.

### **Features**

- Waterproof housing and cable system
- Fast response time and update rate
- Stable and accurate theoretical wind and heading data in dynamic conditions
- Can be programmed to compensate for an installation that is not aligned to the front of a boat/vehicle and/or level
- Can be calibrated to compensate for magnetic deviation caused by ferrous metals and other electro-magnetic fields
- GPS with WAAS and EGNOS

**Table 1: Functions & Outputs**

	110WX	110WXS	120WX	120WXH	150WX	150WXRS	150WXS	200WX	200WX-IPX7	220WX	220WXH
Apparent wind speed & angle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Theoretical wind speed & direction					✓	✓	✓	✓	✓	✓	✓
Heater (Keeps wind channel free of ice)				✓							✓
Air temperature	✓	✓	✓	*	✓	✓	✓	✓	✓	✓	*
Wind chill temperature	✓	✓	✓	*	✓	✓	✓	✓	✓	✓	*
Barometric pressure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Relative humidity	Opt.	✓	Opt.		Opt.	✓	✓	Opt.		Opt.	
Dew point temperature	Opt.	✓	Opt.		Opt.	✓	✓	Opt.		Opt.	
Heat index temperature	Opt.	✓	Opt.		Opt.	✓	✓	Opt.		Opt.	
Rain intensity <sup>a</sup>						✓					
Rain accumulation <sup>a</sup>						✓					
Rain event duration <sup>a</sup>						✓					
Peak time of rain intensity <sup>a</sup>						✓					
3D Magnetic compass heading								✓	✓	✓	✓
2D Magnetic compass heading					✓	✓	✓				
Heading relative to true north					✓	✓	✓	✓	✓	✓	✓
Rate of Turn								✓	✓	✓	✓
Angle of pitch and roll					✓	✓	✓	✓	✓	✓	✓
Rate of pitch & roll					✓	✓	✓	✓	✓	✓	✓
Global Positioning System (GPS)					✓	✓	✓	✓	✓	✓	✓
NMEA 0183: RS-232	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
NMEA 0183: RS-422	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
NMEA 2000®: CAN	✓		✓		✓			✓	✓	✓	
Agriculture compatible: CAN	Opt.	Opt.		Opt.	Opt.	Opt.	Opt.	Opt.			Opt.

a. The rain sensor must be stationary to produce readings.

### Key

\* When the Heater is ON, the Air Temperature and the Wind Chill Temperature functions are OFF. When the Heater is turned OFF, the Air Temperature and the Wind Chill Temperature functions resume automatically.

Opt. is an abbreviation for optional.

## WARNING

**Navigation Aid Only**—The WeatherStation Instrument is an aid to navigation only and should never be solely relied upon. It is not a replacement for traditional navigation aids and techniques. Only official government charts contain all the information needed for safe navigation.

**Follow the safety precautions below to reduce the risk of poor product performance, property damage, personal injury, and/or death.**

**WARNING: Correct Installation Important**

The WeatherStation Instrument must be installed and operated according to the instructions in this owners guide.

**WARNING: Installation Safety**

Always wear safety glasses, a dust mask, and ear protection when installing.

**WARNING: Do Not Install Near Artificial Magnetic Field**

The WeatherStation Instrument must be a minimum of 1 m (3') from ferrous metals and anything that can create a magnetic field to prevent interference to the magnetic compass.

**WARNING: Compass-safe Distance**

The WeatherStation Instrument must be a minimum of 0.3m (1') from other standard and steering compasses.

**WARNING: Electrical Safety**

The power supply must be OFF before making electrical connections.

**WARNING: Voltage**

The power supply voltage must be that specified for the model.

- Heater models 24VDC only
- Land and off-shore models 9 - 40 VDC
- Marine models 9 - 24 VDC

**WARNING: Fuse or Circuit Breaker**

A safe installation requires a 0.5 amp fast-blow fuse or circuit breaker.

**Heater models** require a 3 amp fast-blow fuse or circuit breaker.

**WARNING: Battery**

Make power connections to a power source that is isolated from the engine start battery(s). Voltage drops may cause the WeatherStation instrument to lose information and/or change operating mode.

**WARNING: Calibrating the Compass**

The internal compass may need to be calibrated after the WeatherStation Instrument is installed. Perform the pretest to determine if calibration is necessary.

**WARNING: 150WX**

These models incorporate a two-axis compass. Significant errors can occur in the heading when a vehicle/boat is pitching and rolling. If there is an error in the heading, there also will be a corresponding error in the theoretical wind direction. Errors can be minimized or eliminated by using data from an external compass.

## Understanding Apparent & Theoretical Wind

Virtually all mechanical and ultrasonic anemometers report apparent wind speed and direction. The Airmar WX Series is unique because it calculates both theoretical wind speed and direction relative to ground, and the apparent wind speed and direction. These wind readings are the same if the unit is mounted in a fixed location. However, if the WX Series is mounted on a moving vehicle/boat, the apparent wind is the wind you would feel on your hand if you held it out the window of a moving car. Since the WX Series has a built in GPS and compass, it calculates the theoretical wind based upon the apparent wind, speed of the vehicle, and compass heading.

## Adding External Sensors

The WeatherStation Instrument can receive data from an external sensor(s). If provided, this data will be used in the theoretical wind-speed calculations.

The following NMEA 0183 sentences can be used to provide heading data:

- \$HCHDT—Heading is used for wind calculations.
- \$HCHDG—Heading is used for wind calculations.

When these are seen as input, the output of these sentences is stopped.

Water-speed values can be transmitted to the WeatherStation Instrument. This will modify the theoretical wind speed calculation to provide wind speed relative to water, instead of wind speed relative to ground.

- NMEA 0183—VHW is used for wind speed relative to water calculation.
- NMEA 2000—PGN 128259 (water speed) is used for wind speed relative to water calculations.

The WeatherStation Instrument will automatically detect whether a sensor(s) is internal, external, or not available at all.

- NMEA 0183—Simply connect the external sensor(s) to a Combiner or other NMEA 0183 repeater hardware.
- NMEA 2000—Connect the external sensor(s) to the NMEA 2000 network.

**NOTE:** *When an external speed sensor is connected to both an NMEA 0183 device and an NMEA 2000 network, the WeatherStation Instrument will use NMEA 2000 data.*

**Speed-through-water Sensor**—An external speed sensor can be installed, such as an Airmar Smart™ Sensor. Airmar recommends installing the DST800 to receive water depth, boat speed, and water temperature data.

## Choosing Cables & Hardware

The WeatherStation Instrument can be connected to a device and/or network in several ways. **You must have the correct cable(s) and any needed converting/connecting hardware before beginning the installation.**

<i>WeatherStation Cables</i> (NO heater)	<i>Length</i>	<i>Part No.</i>
• NMEA 0183 cable	10m	33-862-02
• NMEA 2000 cable	6m	33-1029-02
• NMEA 2000 cable	10m	33-1104-01

**NOTE:** Additional cable lengths are available.

<i>Connecting/Converting Hardware</i> (NO heater)	<i>Length</i>	<i>Part No.</i>
• Data Converter: NMEA 0183 to USB		33-801-01
• Combiner: NMEA 0183 to USB		NDC-4-AIR
• U200 Gateway: NMEA 2000 CAN to USB		33-727-01
• Splitter: NMEA 0183 & NMEA 2000	15m	33-632-01
• Splitter: NMEA 0183 & NMEA 2000	30m	33-632-02

### *Heater Models: Cables & Connecting Hardware*

The power to the heater is greatly affected by the total length of the cable run. If the WeatherStation Instrument will be connected to an NMEA 0183 display or a PC and the total length of the cable run will be greater than 20m, additional steps must be taken. To ensure there will be enough power for the heater to function properly, the table below specifies the materials needed for each installation.

Device & Total length of cable run	WeatherStation Cable	Data Converter	Junction Box	Cable: J-box to NMEA display	Cable: J-box to Data Converter	Cable: 14AWG J-box to power supply
NMEA display < 20m	33-1167-XX	—	—	—	—	—
NMEA display > 20m	33-1167-01	—	9 terminals	06-228 Length as required	—	Length as required
PC < 20m	33-1282-XX	33-1081-01	—	—	—	—
PC > 20m	33-1167-01	33-801-01	9 terminals	—	33-862-XX Length as required	Length as required

	<i>Length</i>	<i>Part No.</i>
• WeatherStation cable: NMEA 0183 (RS-422)	10m	33-1282-01
• WeatherStation cable: NMEA 0183 (RS-422)	20m	33-1282-02
• WeatherStation cable: NMEA 0183 (RS-422, no connector)	10m	33-1167-01
• WeatherStation cable: NMEA 0183 (RS-422, no connector)	20m	33-1167-02
• Data Converter: NMEA 0183 to USB (RS-422 < 20m cable run)		33-1081-01
• Data Converter: NMEA 0183 to USB (RS-422 > 20m cable run)		33-801-01
• Combiner: NMEA 0183 to USB		NDC-4-AIR
• WeatherStation cable: NMEA 0183	Sold by the meter	06-228
• Cable: Junction Box to Data Converter/Combiner	1m	33-862-06
• Cable: Junction Box to Data Converter/Combiner	10m	33-862-02
• Cable: Junction Box to Data Converter/Combiner	15m	33-862-01
• Cable: Junction Box to Data Converter/Combiner	25m	33-862-03
• Cable: Junction Box to Data Converter/Combiner	35m	33-862-04
• Cable: Junction Box to Data Converter/Combiner	45m	33-862-05



## Mounts

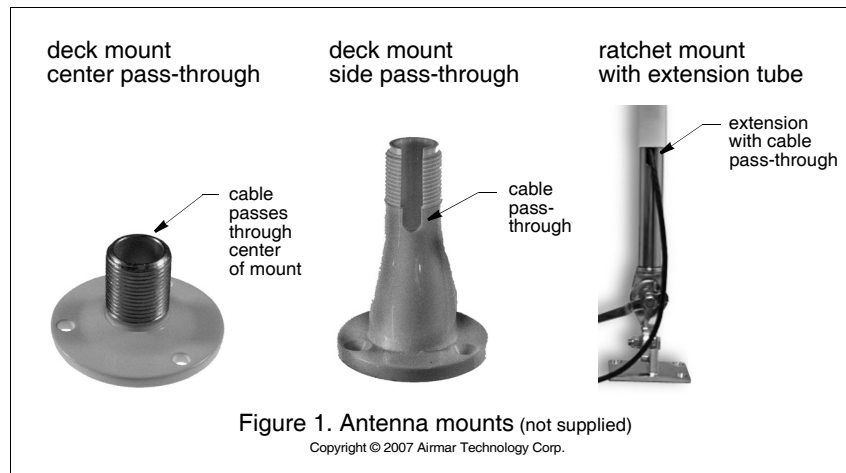
**CAUTION: Vehicles/boats traveling above 30MPH**—Do not use the plastic Cable Side-exit Adapter (part D) supplied. Purchase a stainless steel part. At high speeds, the plastic adapter may break, causing the WeatherStation Instrument to fall off.

**CAUTION: 110WXS, 150WXRS, 150WXS**—Do not use a ratchet mount. Lowering the WeatherStation Instrument may damage the solar-radiation shield.

**NOTE:** The WeatherStation nut has standard 1" -14 UNS or 3/4" NPT threads.

Antenna mount with standard marine 1" -14 threads and pass-through for cable (Figure 1)

Hardware to install antenna mount  
Extension tube (some installations)



## Parts

Humidity Sensor: 110WX, 150WX, 200WX	33-627-01
Humidity Sensor: 110WXS, 150WXRS, 150WXS	33-760-01

## Where to Purchase Parts

Obtain parts from your instrument manufacturer or marine dealer.

### Gemeco

### USA

Tel: 803-693-0777  
email: sales@gemeco.com

### Airmar EMEA

Europe, Middle East, Africa  
Tel: +33.(0)2.23.52.06.48  
email: sales@airmar-emea.com

## **Tools & Materials**

Safety glasses

Dust mask

Ear protection

Pencil

Level

Electric drill

Drill bits

Phillips screwdrivers

Teflon pipe-thread tape (optional)

Deck gland (some installations)

Grommets (some installations)

Cutting pliers (some installations)

Wire strippers (some installations)

Heat-shrink tubing (some installations)

Heat gun (some installations)

Multimeter (some installations)

Cable ties (some installations)

## Choosing the Mounting Location

For accurate readings and a reliable GPS signal, selecting the best location for the WeatherStation Instrument is very important. Easy access and appearance should be secondary considerations. Since each installation is unique, the best separation distances will vary depending on the surroundings and the particular equipment and how it is configured. Choose a location that balances the requirements below:

- *The WeatherStation Instrument must be mounted in “clear air”, away from obstructions in any direction that will interfere with air flowing through the unit.* If there is an obstruction, be sure to mount the WeatherStation Instrument at least 2m (6') away. On land, avoid obstructions such as roofs, chimneys, trees, etc.
- If possible, mount the WeatherStation Instrument higher than any other object. Mount it a minimum of 500mm (20") above the surrounding surfaces.  
**NOTE:** The higher the WeatherStation Instrument is mounted, the less accurate the pitch and roll readings will be.
- To prevent interference to the internal magnetic compass:
  - Mount a minimum of 0.3m (1') from other standard and steering compasses.
  - Mount a minimum of 1m (3') from any structures or equipment that contains ferrous metals.
  - Mount a minimum of 1m (3') from anything that may create a magnetic field such as magnetized materials, electric motors, electronic equipment, engines, generators, power/ignition cables, and batteries. For distances, follow the respective manufacturer's recommendations.
- To prevent interference to the internal GPS (Figure 2):
  - It must have a clear view of the sky to receive satellite signals. A 120° view is optimal. Check for any obstructions such as other boats or buildings.
  - Mount it as far as possible from high-powered transmitting antennas to avoid mutual interference.
  - Mount it lower than any Inmarsat communications antenna.
  - Mount above or below any radar beam. *Do not mount within a radar beam.*

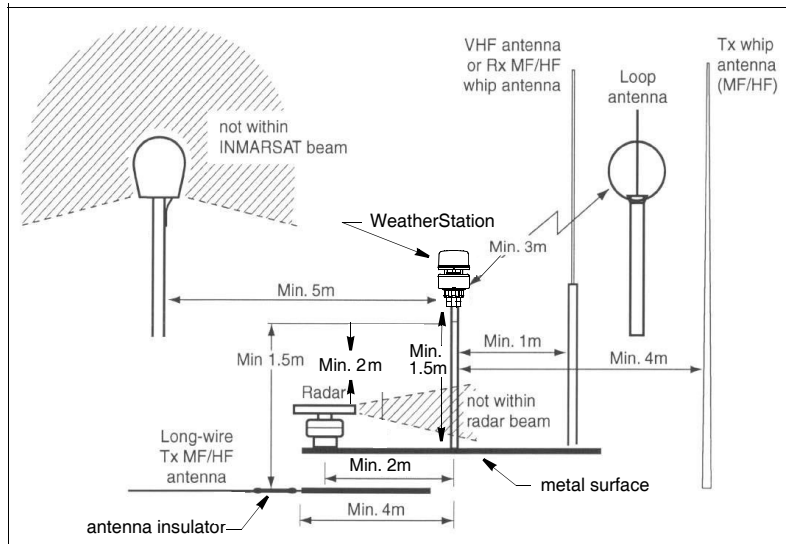


Figure 2. Antennas

## Installing (Figure 3)

**CAUTION:** The reflector plate and the waterproof film found in the wind channel of the WeatherStation Instrument are essential to its operation. Be careful not to scratch the plate, puncture the film, or damage them in any way.

**CAUTION:** The WeatherStation Instrument must be installed upright and vertical, *not* tilted to one side. It must be level and plumb. If the WeatherStation Instrument is tilted from the horizontal plane, it may introduce errors in the compass and wind readings.

**CAUTION:** To accurately measure the wind direction and heading, the alignment notch on the WeatherStation Instrument must be pointed correctly.

- Moving vehicle/boat—The alignment notch must point forward and be parallel to the centerline of the vehicle/boat.
- Stationary surface—It is recommended that the alignment notch point toward true north.

**CAUTION:** Tighten or align the WeatherStation Instrument by grasping the lower housing below the reflector plate. Hand tighten only.

- Do not rotate the cap. Turning it may sever internal connections and void the warranty.
- 110WXS, 150WXR, 150WXS—Do not grasp the solar-radiation shield. The louvers may break.

**CAUTION:** If you use a thread lock, use Teflon pipe-thread tape. Do not use a liquid thread lock as it may weaken the plastic, causing it to swell and crack.

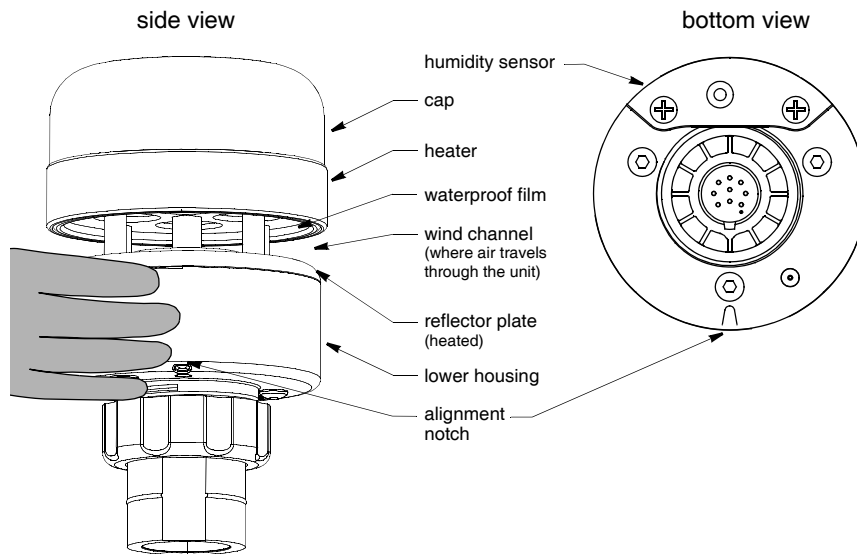


Figure 3. WeatherStation Instrument with heater (120/220WXH shown)  
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### ***Permanent Mounting***

1. Place the mounting hardware at the selected location. Orient any cable exit in the direction that you want the cable to travel (Figure 4).
2. Position the mounting hardware at a 90° angle to the mounting surface. If necessary, use shims to make the mounting surface level.
3. Mark the holes for the mounting screws. If the cable will pass through the center of the mount, also mark that hole.

**NOTE:** *If you are using a ratchet mount, be sure you have purchased an extension with a cable pass-through. Do not use a ratchet mount with the 110WXS, 150WXRS or 150WXS that has a solar-radiation shield.*

4. Drill the holes for the mounting screws and the cable exit if necessary. If the cable is to be fed through a deck, install a high quality deck gland.
5. Using purchased screws, fasten the mount in place.
6. Screw an extension tube onto the antenna mount if desired.

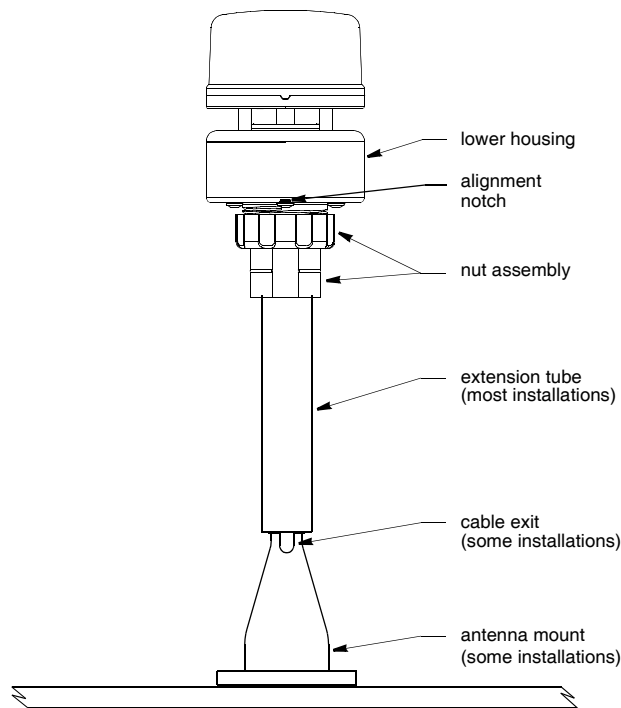


Figure 4. Installation (150WX shown)

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### ***Attaching the Cable to the WeatherStation Instrument***

1. With the nut assembly on the cable near the WeatherStation connector, thread the cable through the extension tube (if used), antenna mount, and the cable exit. *Be sure to leave several inches of cable extending beyond the nut assembly* (Figure 5).

2. Screw the nut assembly onto the top of the antenna mount/extension tube. **Hand tighten** only. Do not over-tighten.

**NOTE:** *If you use a thread lock, use teflon pipe thread tape only.*

3. Remove the protective cover from the connector. (Save the cap to protect the connector, when the WeatherStation Instrument is removed.) Plug the connector into the WeatherStation Instrument. The alignment key on the connector fits into a notch in the base of the WeatherStation Instrument.

4. To accurately measure the wind direction, be sure to orient the alignment notch correctly. Grasp the *lower housing* of the WeatherStation Instrument below the reflector plate and hold it in the proper position (Figure 3).

- Moving vehicle/boat—The alignment notch must point forward and be parallel to the centerline of the vehicle/boat.
- Stationary—It is recommended that the alignment notch point toward true north.

5. Slide the captive nut upward and screw it onto the lower housing of the WeatherStation Instrument (Figures 4 and 5). **Hand tighten** only. Do not over-tighten. *Be careful not to rotate the WeatherStation Instrument, changing the alignment or loosen the nut assembly from the antenna mount/extension tube.*

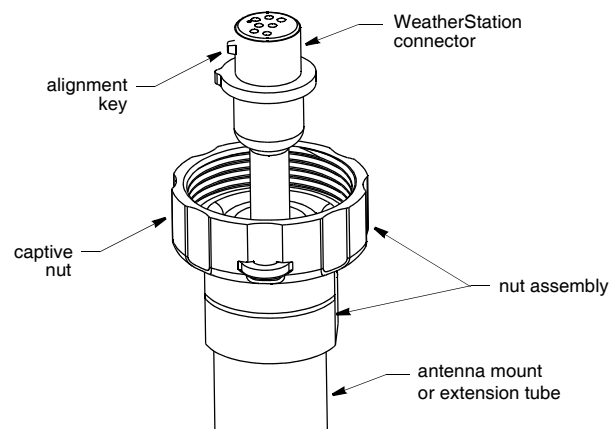


Figure 5. Attaching the cable to the WeatherStation Instrument

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## Cable Routing & Connecting

Depending on the equipment you will be using, route the WeatherStation cable to a Converter, Combiner, Splitter, an NMEA 0183 display, or an NMEA 2000 network. After reading the cautions below, go to the appropriate instructions.

**CAUTION:** Do not remove the waterproof connector(s) to ease cable routing. Buy a cable without a connector. Instructions for wiring are supplied.

**CAUTION:** To reduce electrical interference from other electrical wiring and any on-board equipment with strong magnetic fields such as: radar equipment, radio transmitters, engines, generators, etc., separate the cables by at least 1 m (3'). Ensure that all the cable shields are appropriately grounded.

**CAUTION:** Be careful not to tear the cable jackets when passing them through compartments, bulkheads, or walls. Use grommets to prevent chaffing.

**CAUTION:** Use a multimeter to check the polarity and the connections to the power supply before applying power to the WeatherStation Instrument.

**CAUTION:** Coil any excess cable(s) and secure it with cable ties to prevent damage.

**CAUTION: Heater model with cable run *greater than 20m (60')***—The power to the heater is affected by the total length of the cable run. If the cable run is greater than 20m (60'), additional hardware is needed to ensure that enough power will reach the heater to function properly.

- PC—Connect through a Data Converter or Combiner. Follow the instructions that are supplied with the hardware.
- NMEA 0183 display—Follow the instruction, “Connecting to an NMEA 0183 Display.”

### Connecting to a Data Converter, Combiner, or Splitter

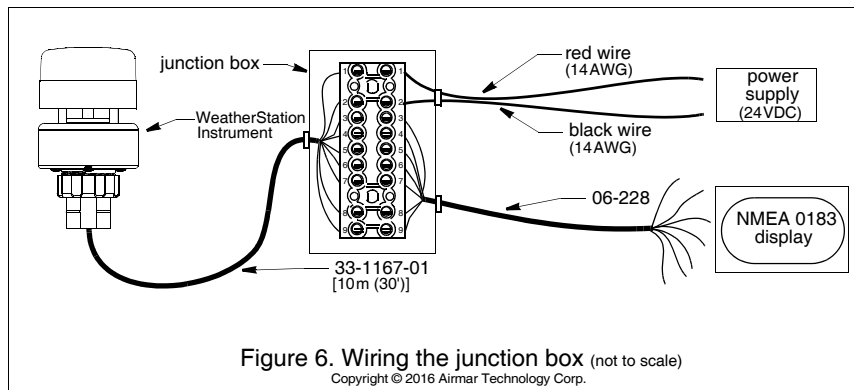
**IMPORTANT:** To connect to a PC it is necessary to install a Data Converter or Combiner. Follow the installation instructions that are supplied with the unit.

### Connecting to an NMEA 0183 Display

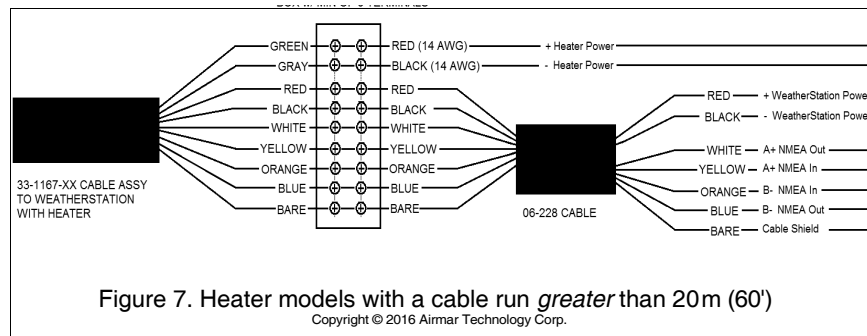
#### Cable Routing

Route the WeatherStation cable to the display. *Do not fasten the cable in place at this time.*

**Heater model with cable run *greater* than 20m (60')—**Route the WeatherStation cable to a junction box (Figure 6). Route a separate cable from the junction box to the NMEA display. Route red and black 14AWG wires from the junction box to a 24VDC power supply. *Do not fasten the cables and wires in place at this time.*



Wire the junction box using the wiring diagram below (Figure 7) To prepare the cables, follow “Preparing the Wires”.





### **Connector on Display End**

If the WeatherStation cable has a connector on the display end, and it can be plugged into the port on the NMEA 0183 display; do so now. Coil any excess cable and secure it with cable ties to prevent damage. Fasten the cable in place.

### **No Connector on Display End: Wiring**

**CAUTION:** The WeatherStation Instrument has either an RS-422 or RS-232 standard. Follow the wiring diagram that matches the WeatherStation Instrument. If it is wired for the wrong standard, it will not transmit and receive data properly.

**CAUTION:** The display power may be wired directly to the WeatherStation cable, or it may be wired separately.

**Heater models MUST be wired separately.**

**CAUTION: Heater models**—It is recommended to use the same 24VDC power supply for both the WeatherStation Instrument and the heater. If using separate power sources, ensure that the supply grounds are common.

### ***Preparing the Wires***

**NOTE:** *If the display does not have NMEA 0183 output connections, the yellow and orange wires are not needed. Apply heat-shrink tubing to each unused wire. Alternatively, the yellow and orange wires can be connected to an external sensor.*

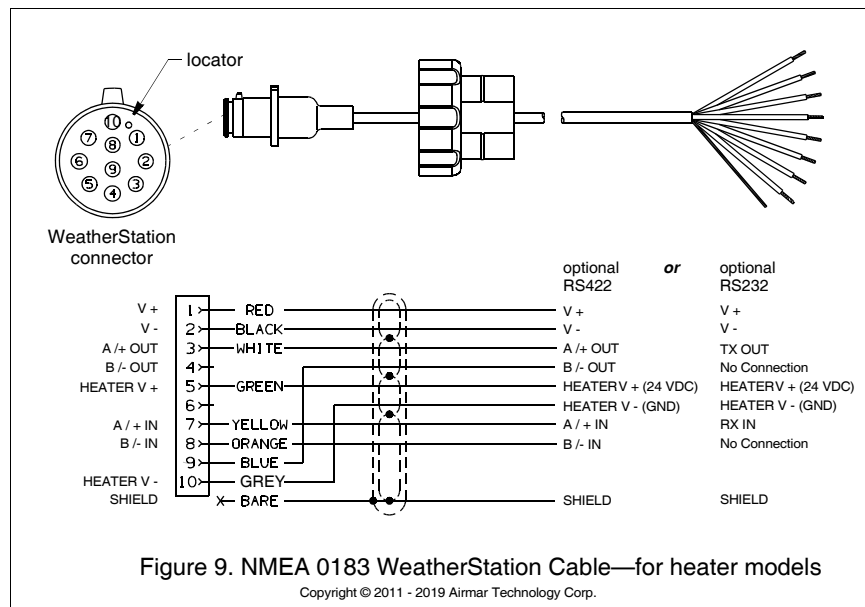
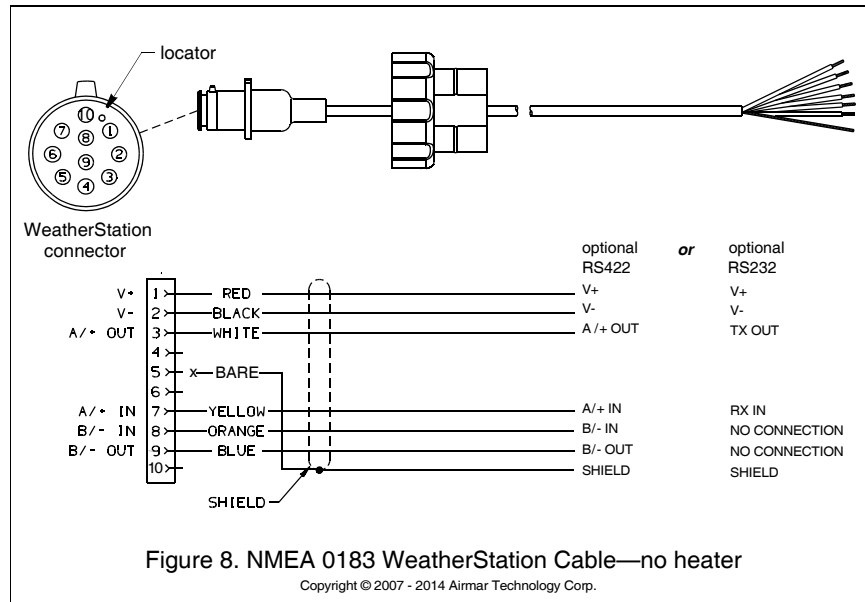
1. Allowing an extra 25 cm (10") for wiring ease, cut the cable to length.
2. Strip 60 mm (2-1/2") of the outer jacket and foil shielding from the cut end of the cable (Figure 8 or 9).
3. Strip 10 mm (3/8") of conductor insulation from the end of each colored wire.
4. Protect the cable's foil shielding from causing a short by using heat-shrink tubing around the jacket where the wires emerge from the cable. The tubing must overlap the wires a minimum of 6mm (1/4"). Shrink the tubing using a heat gun.
5. Being sure the power supply is OFF, connect the wires to the display.
6. Fasten the cable in place.
7. The installation is complete. To begin receiving data, refer to the owner's manual that came with the display.

### Connecting

Refer to the appropriate wiring diagram and the owner's manual that came with the display to connect the colored wires.

**NO heater**—(Figure 8).

**Heater models**—(Figure 9)

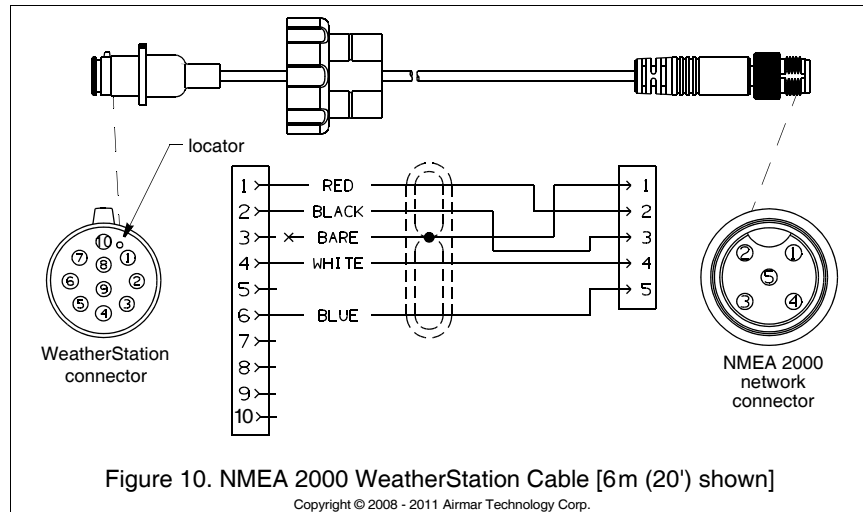


## Connecting to an NMEA 2000® Network

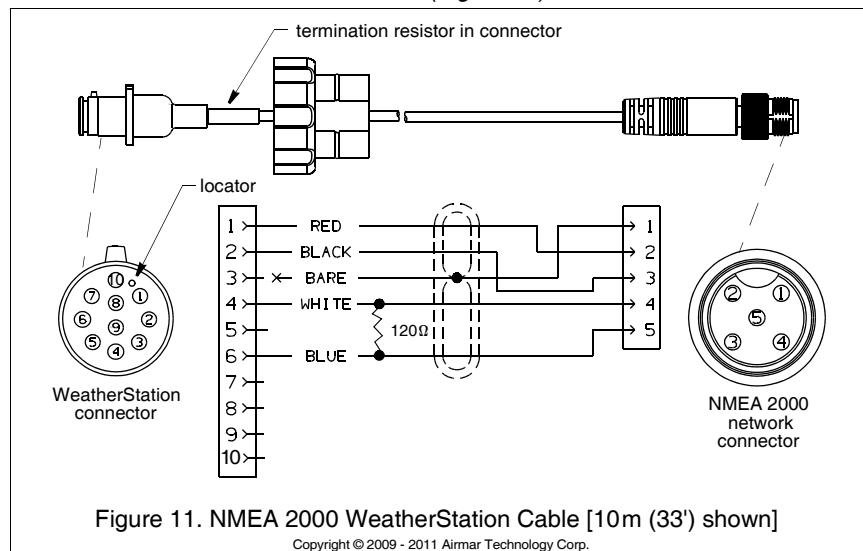
**CAUTION:** Models with a heater cannot be used with an NMEA 2000 network.

**CAUTION:** Only two termination resistors are required on an NMEA 2000 network. More than two will degrade the bus performance.

Route the WeatherStation cable to the NMEA 2000 network. Plug the NMEA 2000 connector into the network node (Figure 10). Coil any excess cable and secure with cable ties to prevent damage.



**NOTE:** WeatherStation cables greater than 6m (20') have a termination resistor built into the WeatherStation connector (Figure 11).



## Calibrating the Compass

**WARNING:** The internal compass may need to be calibrated after the WeatherStation Instrument is installed for maximum accuracy. Perform the pretest below to determine if calibration is necessary.

**CAUTION: Boat**—The Pretest and AutoCalibration Procedure must be done in calm seas in a 0.8 km (0.5 mile) open area away from other boats and ferrous objects such as structures and aids to navigation. Avoid congested areas and waters with strong currents as calibration will be difficult and possibly hazardous.

### *Pretest*

Go to an appropriate site.

- **Vehicle**—Drive to an open parking lot or field, away from other vehicles and ferrous objects.
- **Boat**—In calm seas, navigate to an open area of water, 0.8 km (0.5 mile) of open space away from other boats and ferrous objects.

While making a full circle, compare the WeatherStation heading data to another compass. Check all headings. If the data agrees, there is no magnetic influence on the WeatherStation Instrument. The compass does NOT need to be calibrated. *If the data does not agree, continue with the calibration instructions below.*

### *How to Calibrate*

Calibration can be done in one of two ways.

- Calibrate the compass using the WeatherCaster™ software and a PC.
- Follow the AutoCalibration Procedure below.

### *AutoCalibration Procedure*

**IMPORTANT:** Calibration requires the vehicle/boat to complete 2 to 3 circles.

**IMPORTANT:** In the event of a calibration failure, repeat the procedure.

1. At the site where the pretest was performed, select the display page on the NMEA Instrument that shows Heading.
2. Shut OFF and then turn ON the DC power that is connected to the WeatherStation Instrument.
3. Within 2 minutes of cycling power to the WeatherStation Instrument, start the vehicle/boat in a slow [4.5 to 7 MPH (4 to 6 knots)] circular turn that takes about 2 to 3 minutes to complete.\*

If the vehicle/boat completes 1.5 circles within 3 to 4.5 minutes, AutoCalibration will begin. Heading will stop being reported on any NMEA 0183 or NMEA 2000 display until the calibration is finished.

4. Keep turning in the same circle for 1 to 2 more complete circles.  
*Do not change the speed or rate of turn through the circle.*
5. When calibration is completed successfully, Heading will return to the display. If calibration fails, the display will flash Heading ON and OFF in 10 second intervals for 60 seconds. (Display times may vary by manufacturer.)

\* The optimum rate of turn is 180°/minute: 3°/second, 30°/10 seconds, 45°/15 seconds, and 90°/30 seconds.

## **Operation**

### ***Heater: 120WXH, 220WXH***

**NOTE:** *When the Heater is ON, the Air Temperature and the Wind Chill Temperature functions are OFF. When the Heater is OFF, the Air Temperature and the Wind Chill Temperature functions resume automatically.*

The heater can operate in three different modes.

- OFF—The heater is always off.
- Automatic—The heater switches ON when the housing temperature falls below 1°C. It switches OFF when the housing reaches >5°C.  
**NOTE:** The temperature can be adjusted between 2°C and 20°C.
- User Control—This mode can be accessed by serial command or a physical switch on the power supply.

### ***Rain Sensor: 150WXRS***

The WeatherStation Instrument must be stationary to make accurate rain readings.

## Maintenance

**CAUTION:** Do not disassemble the WeatherStation Instrument. There are no user-serviceable parts inside. Removing the three screws holding the lower housing will damage the waterproof seal, voiding the warranty.

**CAUTION:** Do not immerse in water or pressure wash. Doing so may allow water to infiltrate the WeatherStation Instrument, voiding the warranty.

**CAUTION:** The reflector plate and the waterproof film found in the wind channel of the WeatherStation Instrument are essential to its operation. The waterproof film protects the transducers, so be careful to keep it intact. Do not scratch the reflector plate or damage it in any way.

**CAUTION:** Keep the wind channel and any louvers or rain sensor free of spider webs, insects, dirt, and other debris.

### *Cleaning*

Since the WeatherStation Instrument has no moving parts, it requires minimal maintenance. Clean the exterior with a damp cloth and mild household detergent. Gently thread an alcohol wipe through the wind channel and under any rain sensor to remove spider webs and any debris (Figure 12).

**110WXS, 150WXRS, 150WXS**—Gently clean under the louvers with a duster.

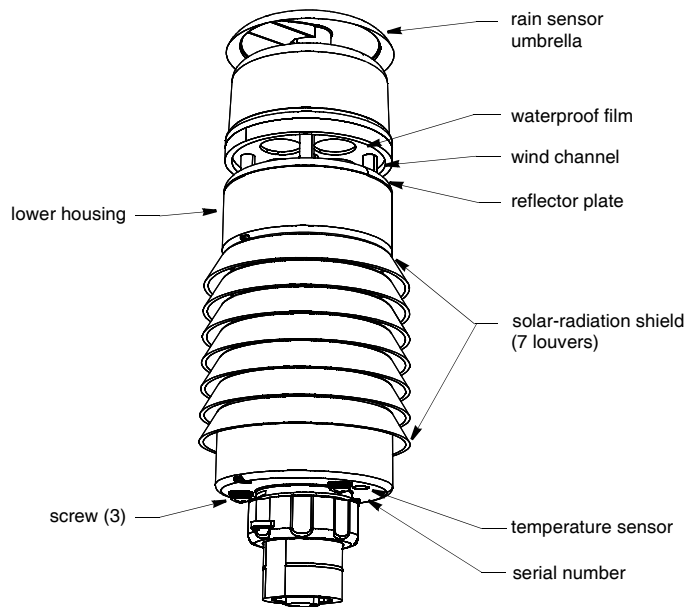


Figure 12. Maintenance (150WXRS shown)  
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## **Software**

### ***Revisions***

Airmar may release updated versions of both the WeatherStation firmware and the WeatherCaster™ software. Periodically check Airmar's website at [www.airmar.com](http://www.airmar.com) to down-load the latest revision.

### ***Installing WeatherCaster™ Software***

Follow the instructions in the *WeatherCaster Software Guide*.

## Troubleshooting

### ***No Readings or Inaccurate Readings***

- Is there power to the WeatherStation Instrument?
- Are all the connections tight?
- Is the cable-run free of kinks or damage?
- Is the wiring correct?
- Are there any obstructions in the wind channel, solar-radiation shield, or rain sensor?  
*Keep it free of spider webs, insects, dirt, and other debris.*  
*Be careful not to puncture the waterproof film or scratch the reflector plate.*
- Are the temperature and humidity sensors clean?
- Is there ice on the WeatherStation Instrument?

### ***No GPS Fix***

- Does the WeatherStation Instrument have a clear view of the sky?

### ***Wind Readings Are Too Low on Moving Platform***

- Is the WeatherStation Instrument mounted forward and low on the boat/vehicle's hardtop in dead air?  
*Move the WeatherStation Instrument farther back and higher (Figure 13).*

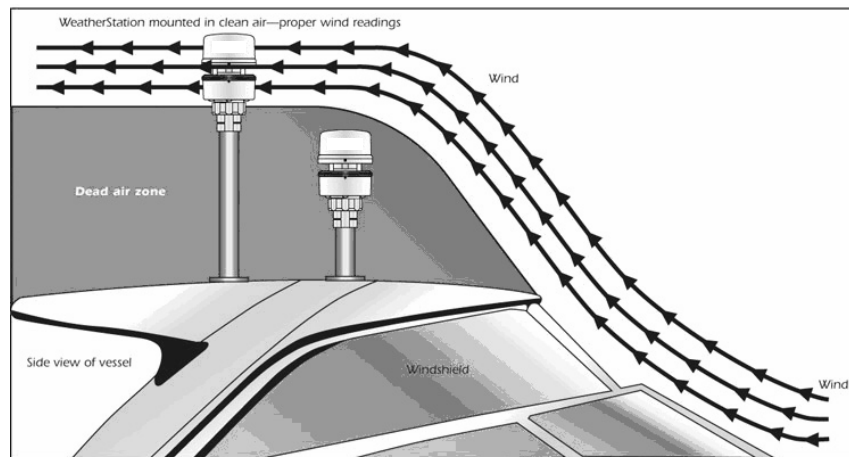


Figure 13. Boat/vehicle mounting location (boat shown)

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### ***Heater Not Working***

- Is there 24VDC supply voltage to the heater?

**NOTE:** *The heater does not cycle ON until the air temperature reaches 1°C.*

### ***Rain Readings Inaccurate***

- Is the sensor stationary?

### ***Humidity Readings are Inaccurate: 110WXS, 150WXRS, 150WXS***

- Are there any obstructions in the solar-radiation shield?  
*Keep the louvers free of spider webs, insects, dirt, and other debris.*



## **Technical Information**

### ***Additional Data Available from the WeatherStation Instrument***

There are parameters that the WeatherStation Instrument can make available to the user. Usually, more data is available from the WeatherStation Instrument than can be displayed in a reasonable format on a screen. Also, if all the data was continuously transmitted to the display, the update rate would be too slow and could not keep up with WeatherStation measurements. Consequently, some parameters are transmitted while others are not, based on a preselected list. Note that those parameters not transmitted are, nevertheless, retained in the WeatherStation Instrument. For more detailed information, visit [www.airmar.com](http://www.airmar.com) and go to Installation Instructions and Owner's Guides > WeatherStation Instruments > Technical Manual or see the "Technical Manual" on the WeatherCaster CD.

### ***NMEA 2000: Load Equivalency Number***

LEN is the amount of current a device draws from an NMEA 2000 network.  
(1 LEN = 50 mA)

NMEA 2000 Load Equivalency Number (LEN)	
120WX.....	2
220WX.....	4

### ***Specifications***

Product specifications are measured under laboratory conditions. The installation and surrounding environment can impact the product's performance. Airmar recommends that best installation practices as defined by the World Meteorological Organization (WMO) are followed in your installation.

### ***Abbreviations & Acronyms***

CD	Compact Disk
CAN	Controller Area Network
EGNOS	European Geostationary Navigation Overlay Service
GPS	Global Positioning System
LEN	Load Equivalency Number
NPT	National Pipe Thread
NMEA	National Marine Electronics Association
Opt.	Optional
PC	Personal Computer
UNS	Unified National Standard
USB	Universal Serial Bus
VDC	Volts of Direct Current
WAAS	Wide Area Augmentation System

### ***Glossary***

Firmware	The software within the WeatherStation hardware
WeatherCaster™ software	The PC application program

### ***Trademarks***

Airmar® is a registered trademark of Airmar Technology Corporation.

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## Notes



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