



THUNDER EAGLE, INC.
Wireless Alerting Systems

Texas Weather Instruments Professional Weather Station Quick Start and Troubleshooting Guide

Part One: Installation

Proper installation of the sensors is critical to the reliable operation of your Texas Weather (TxWx) Instruments professional weather station.

Radio Frequency (RF) interference can cause incorrect readings. Place the sensors on a well-grounded tower or mast, and keep them as far from transmitting antennas as possible. It is also recommended that you install a copper grounding rod and run the heavy gauge wire directly behind the hose clamps of the junction box to ground both the mast and your junction box. (See Page 6 for a list of sources for antenna masts.)

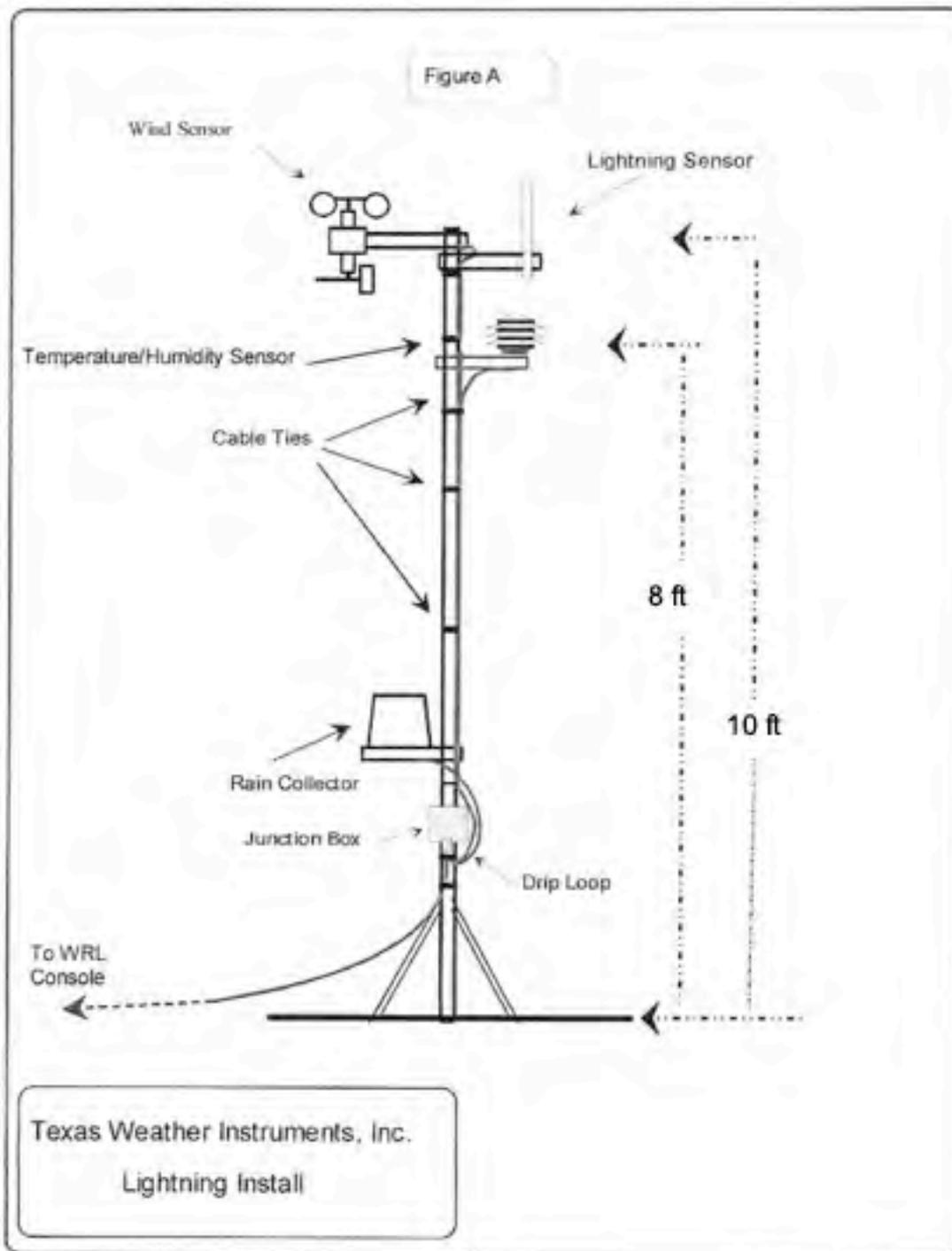
Be careful not to contact any overhead power wires while you are installing this equipment!

Refer to Figure A (page 2) for recommended height and spacing of the sensors.

- The solar sensor and the lightning sensor are located on one sensor unit. The solar sensor should face South and not be in the shade of any other sensor or support structure. We recommend a height of 10 feet above roof level to limit the range of the lightning detector. (See the Figure C on page 3.) A lightning sensor mounted too high will be abnormally sensitive and show lightning from too great a distance from the weather station, potentially many hundreds of miles distant, which will not be useful.
- The wind direction and speed sensor should also be mounted about 10 feet above the roof of the building and should point North. The wind direction can be calibrated from remote software after installation to provide a true reading.
- The outside temperature/humidity pagoda should be mounted about two feet below the wind sensor, or about eight feet above the roof, to avoid abnormally high readings generated by a hot roof. Mount the pagoda away from RF (radio frequency) transmitting sources which many cause abnormal readings.
- The rain collector should be mounted at a low level on the mast to make it easier to clean when necessary. Use a bubble level to make sure the collector is as level as possible. The sensor will not read correctly if it is not level.
- Mount the junction box under the rain collector using the hose clamps that are installed on the box.
 - **Make sure the junction box is in a location where you can safely access the junction box to troubleshoot the TxWx system.**

- **Mount the junction box with the hole pointing DOWN to avoid water getting into the junction box.**
- **Be sure to leave a 'drip loop' as shown in Figure A to keep rain from getting into the junction box.** If water gets into the junction box, the sensors will stop working and strange output, such as extremely high temperature readings, will appear.

Refer to Figure B (page 3) for directions on connecting the sensor leads and the intermediate cables from the console to the junction box. There are three color coded wires and one round wire for the lightning sensor option. These are described in table 1. Once the cables have been connected in the junction box, make sure the cover of the junction box is tight, taking care NOT to squeeze the wires or connectors. **Make sure that the rubber gasket is properly seated so the box will remain watertight.**



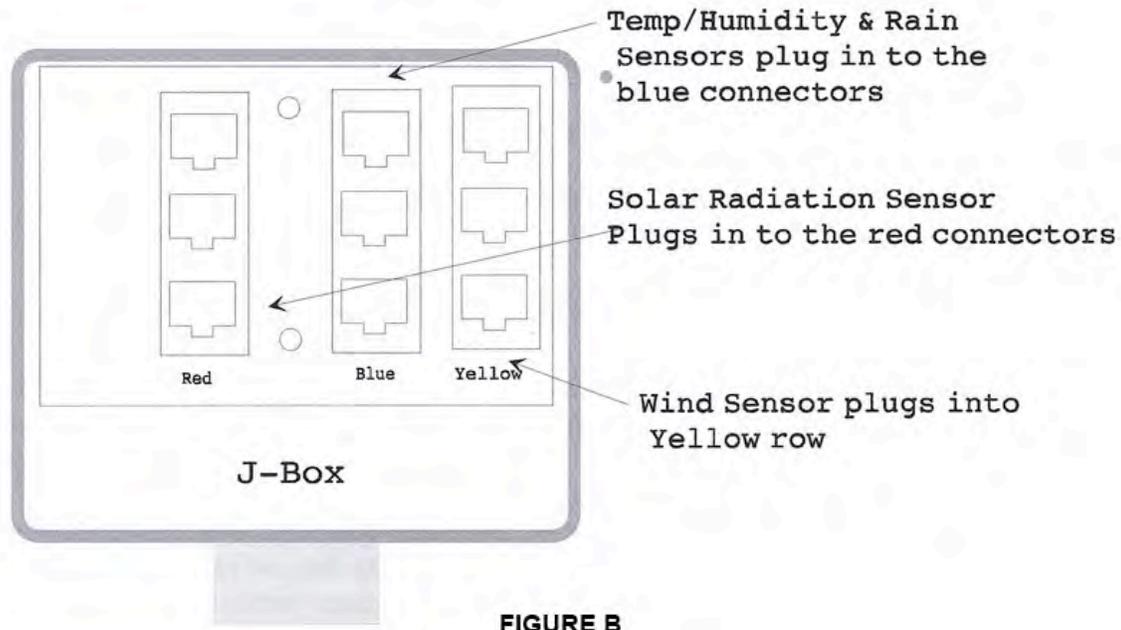


FIGURE B

Table 1: Description of Sensor Cables and Connections

Color / Description	Function
Blue	(2 sensors) Temp/Humidity/Barometer pagoda and rain gauge. The sensors join in the junction box.
Red	(2 sensors) Indoor temperature and Solar. Indoor temp plugs directly into the console. The Solar sensor plugs into the junction box
Yellow	Wind speed and direction though the junction box
Black round (BNC)	Lightning sensor

The lightning sensor ground wire in the junction box is small and somewhat fragile. Take care not to detach this wire accidentally.

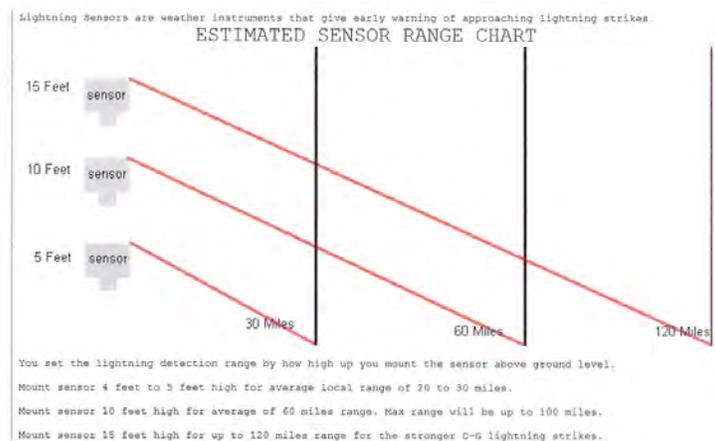


Figure C: Lightning Sensor Range

When passing the intermediate cables back into the building, be sure they do not rub against any sharp edges, which could cause a short circuit. Try not to run the cables along any power wires or radio transmitter cables which may cause abnormal readings.

Connect the color-coded intermediate cables to their corresponding jacks in the back of the Texas Weather Instruments console.

The Texas Weather Instruments (TxWx) console connects to the Thunder Eagle (TE) website via a serial-to-ethernet connection supplied by TE through a special serial cable. Please make sure that you place the serial cable in the correct direction with the label on the end toward the TxWx unit

Part Two: Calibration and Setup

There are many TxWx settings that can be made by software to configure the unit for local operation, including temperature, barometer and humidity. An excellent way to get the local climatology is to access <http://www.weather.gov>, then type in your zip code, or city, state, and then look for local climatology. Settings on the TxWx unit are listed below: Suggested values are in () and the number of digits accepted by the settings are shown by the number of x's (XX)

Solar Value / Aux Temp (xx)
Inside Temp (xx)
Outside Temp (xx)
Barometer (xxxx)
Rain Increment Type (x) (2)
Rain Increment Value (x) (1)
Wind Offset (xxx) degrees
Year (xx)
Month (xx)
Day (xx)
Hours (xx)
Minutes (xx)
Seconds (xx)
Humidity 0.0% (xxxx) mV (inverse)
Humidity 75.3% (xxxx) mV (inverse)
Rain - Day (xxxx)
Rain - Month (xxxx)
Term (Year) Rain (xxxx)
UnitNumber (0-255)
Read PwrOnReset Count
English=0/Metric=1
Elevation (xxxxx)
Rainfall Rate Sensing (min)(1)

The humidity is adjusted by the 75.3% setting, usually around 3000. Generally, the higher the number, the lower the humidity. It is recommended to change this setting by 250 until you are close to the correct value, then increment by a smaller value until the TxWx shows the correct reading.

The rain output is set for a 1-minute average, which approximates an instantaneous value. Rain sensing is not precise. The rain gauge works by a set amount of rain tipping a see-saw bucket within the rain sensor. If it is raining very lightly, it may take a long time to tip the bucket and the rain rate (over a short period of time) will be zero, although it is raining lightly. The advantage of a 1 minute sample is that as soon as it is raining fairly

steadily, the rain sensor (for the last minute) will show rainfall. The rainfall rate will also stop about one minute after it stops raining steadily. This has proven more useful than a rainfall rate over the past 30-60 minutes.

Also, the daily high rainfall rate is determined by clock hour. The highest rate divided by 60 minutes. Thus, there may be an instantaneous cloud burst with a high rain rate, which may appear in the current observations, but the daily high rain rate will not be determined until the top of the hour and will be the high rain rate for the past hour. It is important to understand how these rain rates are determined in order to understand the rain analysis system.

The lightning sensor is set for a 6-minute average instead of the instantaneous value. It has proven more useful to know that lightning has occurred recently and therefore you need to watch for lightning for a time period after the last strike.

Daily highs and lows can be reset by software if necessary.

The TE software can be set to sync the TxWx clock with server time once per day.

The term rain calculation is the year to date precipitation value and should be reset on January 1 each year. The TE software will attempt to do this automatically.

Part Three: Troubleshooting Hints

The TxWx is a very reliable and widely implemented professional weather station. It has many diagnostic features that are useful in troubleshooting. If you think you are having an issue with the TxWx, please take the time to observe the unit and to note any unusual output.

Generally, either an abnormally high or low reading (such as 466 degrees or -95 degrees) means the wire / sensor is either shorted or open.

The yellow and blue wires are the same and can be swapped (on both ends) for troubleshooting if you feel that you have a cable problem. The yellow and blue wires are common cat-5 computer cables.

If a connectivity issue still cannot be tracked down, it is sometimes helpful to open up the TxWx console and plug the intermediate cables directly into the circuit board.

A TE troubleshooting board is available for advanced TxWx troubleshooting.

Lightning Sensor

If the lightning sensor is providing an abnormally high reading:

- Make sure the lightning sensor is not mounted too high.
- Make sure the lightning sensor is properly grounded through the ground clamp in the junction box.

Rain Gauge

Make sure the rain gauge is level in all directions. If the gauge is not incrementing with rain, check the rain gauge with a level.

Make sure the rain gauge is not jammed. Often debris can clog the hole at the bottom of the rain gauge. If this happens regularly, the hole can be carefully enlarged with a 1/4" drill.

If the rain gauge is still not registering, first check to make sure all of the blue-banded cables are firmly in place. Disconnect them and reinsert them until they click into place.

Test the rain gauge by either running water into the rain gauge, or by slowly rocking the rain gauge back and forth. You will hear the internal seesaw measuring cup click on and off with each rock of the gauge and the daily, monthly, and term (yearly) rain should increment upwardly .01 with each click of the rain gauge.

If the rain is still not incrementing, make sure the rain gauge settings are correct on the console:

1. Press the Select and Scale buttons simultaneously to place the TxWx into the settings mode.
2. Press the Select button 4 times until only one setting appears in the rain area of the TxWx station.
3. Press the max-min button until it reads 2.
4. Press Select once.
5. Press min-max until it reads .01
6. Press Select 3 times until all of the data appears.
7. Unplug, wait for 15 seconds, and re plug in the TxWx system to make sure the changes were accepted by the unit
8. Press the above buttons again and make sure the correct settings are in the TxWx unit

Retest the rain gauge by either running water into the rain gauge, or by rocking the rain gauge back and forth. The daily, monthly, and term (yearly) rain should increment upwardly .01 with each click of the rain gauge.

Note: In the winter, the rain gauge may freeze and not show rain/snow/precipitation until the snow melts. A high precipitation rate may be shown on the melting day, although precipitation is not occurring.

Temperature

If the daily low temperature is decrementing after a reset, usually in the range of 55 degrees, check for RF near the temperature sensor. Move the sensor. Reset the daily low and watch for any changes in low temp.

Network Connection Problems

To verify that the baud rate on the serial connection is correct:

1. Press the select and average button at the same time and release.
2. Press select 3 times
3. Adjust Baud Rate using minimum maximum keys (9600)
4. Press select until all the lights come back on.

Sources for Antenna Masts and Accessories

Antenna masts and accessories should be readily available from commercial radio equipment suppliers. We have also had success with equipment from Radio Shack and from McMaster-Carr. See illustrations below.



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Showing 1 - 9 of 9 Products

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U Bolt and Clamp

\$5.99

(1 review)

AVAILABILITY: In-Stock



RadioShack® Dual Guy Wire Mast Clamp

\$7.99

(No reviews)

AVAILABILITY: In-Stock



RadioShack® Guy Wire Turnbuckles (2-Pack)

\$7.99

(No reviews)

AVAILABILITY: In-Stock



Antennacraft® 5-Ft. 18-Gauge Galvanized Steel Mast

\$9.99

(No reviews)

AVAILABILITY: In-Stock



4" Antenna Mast Wall Mount

\$13.99

(6 reviews)

Free Ground Shipping on this product

AVAILABILITY: Out-of-Stock



Antennacraft® 5-Ft. 16-Gauge Mast

\$16.99

(3 reviews)

Free Ground Shipping on this product

AVAILABILITY: In-Store Only



Antennacraft® Universal Antenna Mount

\$17.99

(4 reviews)

Free Ground Shipping on this product

AVAILABILITY: In-Stock



Eaves Mount for Hanging Rafters or Trim Boards

\$19.99

(4 reviews)

Free Ground Shipping on this product

AVAILABILITY: Out-of-Stock



Antennacraft® 5-Ft. 16-Gauge Mast

\$16.99

(3 reviews)

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Antenna Mounts



Tripod



Nonpenetrating
Tripod with Mast



Wall-Mount
Brackets

Use these mounts to hold your antennas in place.

Tripod is 3 ft. high and made of 18-ga., 1 1/4" dia. steel tubing. It fits antenna masts up to 1 3/4" dia. Legs adjust to fit angled or flat roofs. Each leg has three 3/8" dia. mounting holes (mounting hardware not included).

Nonpenetrating tripod with mast mounts on a flat roof—no mounting holes required. Standard-sized concrete blocks fit into the frame to anchor it in place. Tripod is 3 ft. high with a 5-ft. metal mast. Tripod and mast are made of 18-ga., 1 1/4" dia steel tubing. Frame is 12-ga. steel.

Mast is 5 ft. high and made of 16-ga., 1 1/4" dia. steel tubing.

Tar pads are used under tripod mounting feet to seal against moisture (mounting screws included).

Wall-mount brackets accept masts with diameters up to 1 3/4". A mounted mast sits 4" away from the surface. Mounting hardware is included. Brackets are made of 12-ga. galvanized steel.

		Each
Tripod	9601K1	\$29.36
Nonpenetrating Tripod with Mast	9601K2	71.82
Mast	9601K3	11.91
Tar Pads (3/Pkg.)	9601K5	Per Pkg. \$2.73
Wall-Mount Brackets (2/Pkg.)	9601K4	Per Pkg. 7.45

