



WS PRO LT Weather Station

Installation Manual

WS PRO LT Weather Station Installation Manual

This manual covers the procedure for installing your WS PRO LT weather station, for both direct connect and wireless communication and for solar and DC powered options. Before installing the weather station(s) at your site, read over the discussions of power sources, site selection, grounding, wireless communication and direct connect weather stations.

Power Sources

Weather stations have an internal sealed rechargeable battery that must be recharged to assure continued system function. For recharging the battery, a solar panel or a user supplied external DC power source that has a nominal rating of 18 V at 1 amp output is required.

Site Selection

The ideal site is representative of the general area, is level, and well away from obstructions such as buildings, trees, and steep slopes. If obstructions exist, use the Ten Times the Height Rule, which is illustrated in Figure 1.

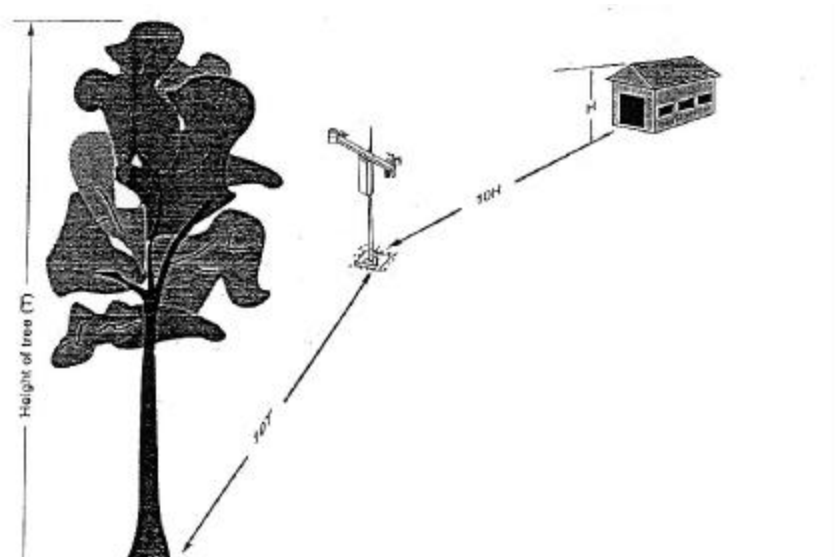


Figure 1 Ten Times the Height Rule.

For example, if the height of the tree T is 8 feet and the height of the shed H is 7 feet, install the weather station at least 80 ft away from the tree (i.e., $10T = 10 \times 8 = 80$ ft) and 70 ft away from the shed (i.e., $10H = 10 \times 7 = 70$ ft).

Do not place the weather station near a sprinkler where it is likely to be sprayed by water, as this will change the rain reported by weather station.

Note: If your weather station will be inside a fence to discourage vandalism, the fence top must be lower than the wind sensors even if the fence is chain-link.

Grounding

Outdoor cables may be subject to induced currents due to lightning or other environmental factors. Therefore, proper grounding is imperative to avoid damage to the weather station and/or the Host computer. Review document D31910 for grounding recommendations.

Wireless Communication Weather Station

Wireless communication weather stations are available for installations within ½ mile / 0.8 km (1/4 mile / 0.4 km for 2.4GHz models) of the central control computer.

This range assumes no obstructions are in the line-of-sight. Line-of-sight is defined as a straight path between a transmitting and receiving antenna that is unobstructed by intermediate topography or obstructions. A clear line-of-sight is required to achieve the optimum transmission range. The affect of obstructions on the transmission range can vary. Therefore, if obstructions lie within the line-of-sight, you should test your radio transmissions before permanently installing your weather station .

Wireless weather stations are equipped with spread spectrum radios and include a second spread spectrum radio that is installed at the central control computer.

To test the radio transmission of your weather station carry the weather station to the site then attempt to communicate with the central control computer. If obstructions in the line of sight are preventing the weather station from communicating, try the following:

- Relocate your weather station away from obstructions
- Remove the obstructions
- Mount the computer base station antenna outside of the building by running the antenna cable through a window or cable run
- Use a higher gain antenna (optional) at the computer site
- Install a higher gain antenna (optional) on the roof of the computer base station building and align it above the obstructions.

Direct Connect Weather Station

Direct connect weather stations are available for installations that require the weather station be placed more than a ½ mile line of sight from the central control computer. They can be installed as far as 20,000 feet / 6,096 m (~3.8 miles) from the central control computer.

Computer Requirements

- Cirrus, NimbusII, or StratusII central control system with Automatic ET and Multiple Weather Stations modules. *Modules are optional with NimbusII and StratusII central control systems.*

Note: The Multiple Weather Stations module is only required if multiple weather stations will be connected to one central control system.

- Windows 98/2000 or XP Operating System
- Available COM Port

Weather Station Setup

1. Remove the top foam packing from the box and verify you have all ordered equipment (see Equipment List). *Report missing or damaged equipment to your local Rain Bird distributor before installing your system.*

Equipment List

	Models	Direct Connect	Direct Connect <i>Solar Powered</i>	Wireless	Wireless Solar Powered	Wireless 2.4 GHz Solar Powered
1.	WS PRO LT Weather Station	X	X	X	X	X
2.	RS-232, serial communications cable (9-pin to 9-pin)	X	X	X	X	X
3.	Two keys	X	X	X	X	X
4.	RF 400-series Spread Spectrum Radio			X	X	
5.	RF415-series Spread Spectrum Radio					X
6.	Antenna			X	X	X (whip antenna)
7.	RFXXX AC Adapter			X	X	X
8.	Solar Panel		X		X	X
9.	Solar Panel Mounting Hardware		X		X	X
10.	RAD Modem for computer	X	X			
11.	RAD modem (in white box) for weather station	X	X			
12.	Cable for connection between weather station and RAD modem at weather station	X	X			
13.	Cable for connection between RAD modem at weather station and MSP-1 (9720)	X	X			

2. Use the lift straps to remove the weather station, since removing the station by lifting on the sensors may damage the sensors (see Figure 2)



Figure 2 Lift Straps

Note: Avoid resting the weather station on the wind speed and wind direction sensors

3. Connect the serial cable (male connector) to the weather station's RS-232 port. *Be sure to remove dust cover from the weather station RS-232 port before connecting the cable.*
4. Connect the serial cable (female connector) to computer serial COM port
5. Connect power to the weather station (i.e. solar power, user supplied DC power)
6. Turn the key to the ON position.

Weather Station Configuration

1. Request **Automatic ET** and **Multiple Weather Stations** module keycodes from Global Service Plan (GSP) or from your local Rain Bird distributor
2. Start Rain Bird central control software (i.e. Cirrus, NimbusII or StratusII)
3. Enter your keycode by clicking on the **Software Modules Options** button and entering the keycode(s) in the corresponding box (see Figure 3)

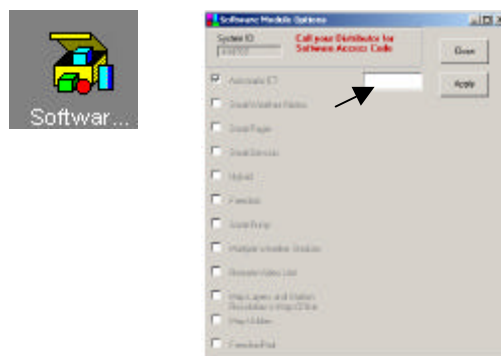


Figure 3 Keycode Dialog Box

4. Click **Apply** button
5. Click **Close** button
6. Click on **Today's ET / Weather Data** button
7. Click on **Weather Station Configuration** button
8. Select weather station from drop down menu (see Figure 4)

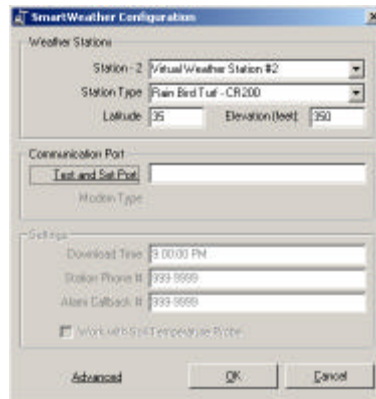


Figure 4 Weather Station Configuration

9. Select Station Type **Rain Bird Turf-CR200**
10. Enter latitude and elevation where weather station will be installed
11. Assign port by clicking on **Test and Set Port** (see Figure 5)

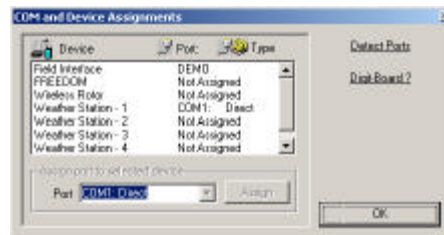


Figure 5 Test and Set Port

12. Select weather station
13. Select COM Port (assign to available COM port)
14. Click **Assign** button
15. Click **OK** button
16. Enter download time
17. Repeat steps 8-16 for 2nd, 3rd, ..., 5th weather stations

18. Click OK when you have complete the setup

Verify Serial Communication with Weather Station

1. Click on **Weather Program** button

Note: To access **Weather Program** from main menu, first select **Today's ET / Weather Data** button

2. Click on **Monitor Current Data** button

3. Monitor the sensor displays. Within a couple of minutes, numerical values should appear on the screen and indicator lights on the bottom of the weather station, labeled Scan/Receive, will blink every ten seconds, confirming communication between the weather station and the computer.

4. Synchronize the weather station time to the computer time by clicking on **Synchronize WS Time** button

5. Close the monitoring window

6. Disconnect the serial cable from the weather station and place the dust cover back on the serial port. Continue with **Radio Setup for Wireless Weather Station** or for direct connect weather stations, refer to **Communication Wiring...** instructions.

Radio Setup for Wireless Weather Stations

1. Attach antenna to the radio connector labeled Antenna

2. Connect the serial cable male connector to the radio connector labeled **PWR/TW-RX**

3. Connect the serial cable female connector to a computer serial COM port

4. Plug the RFXXX AC adapter to the RFXXX connector labeled **DC Pwr input**

5. Plug the other end of the RFXXX AC adapter into a grounded AC wall outlet. The red Pwr/Tx status light should illuminate

6. Click on **Weather Program** button

Note: To access **Weather Program** from main menu, first select **Today's ET / Weather Data** button

7. Click on **Monitor Current Data** button

8. Monitor the sensor displays. Within a couple of minutes, numerical values should appear on the screen and indicator lights on the bottom of the weather station, labeled Scan/Receive, will blink every ten seconds, confirming communication between the weather station and the computer.

9. If the radio is not communicating properly, you may be experiencing interference from nearby equipment such as wireless phones, other spread spectrum radios, or another weather station. Change the location of the weather station.

10. If your radio is working properly, close the weather software and turn the key to the off position. You are now ready to install your weather station at a site within ½ mile from the central computer.

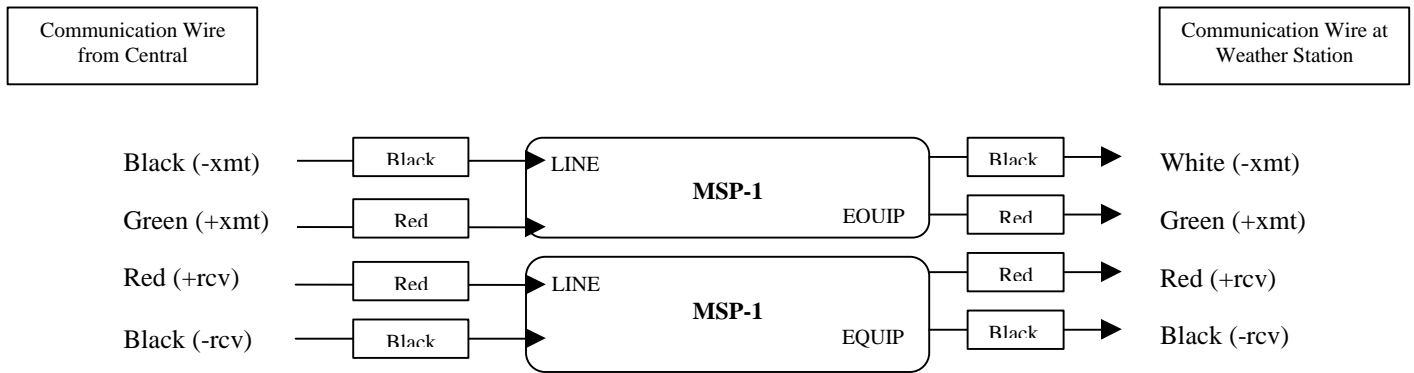
Communication Wiring Setup for Direct Connect Weather Stations

1. Furnish and install a Belden #9883 Direct Burial Type, communication cable between the weather station and the central control computer (not to exceed 20,000 ft. / 3.8 miles)

Note: The Belden cable should consist of three (3) twisted pairs of wires (20 gauge), a bare copper drain wire and an aluminum shield. The three (3) twisted pairs shall be color coded as follows: one (1) black and green pair, one (1) black and red pair, and one (1) black and white pair

At the weather station...

2. Connect the Black (-xmt) and Green (+xmt) pair of wires (of the communication cable) to the Black and Red wires respectively on the Line end of the first MSP-1
3. Connect the Black and Red wires on the Equip end of the first MSP-1 to the White (-xmt) and Green (+xmt) wires of the cable (9720) furnished with the weather station
4. Connect the Red (+rcv) and Black (-rcv) pair of wires (of the communication cable) to the Red and Black wires respectively on the Line end of the second MSP-1
5. Connect the Red and Black wires on the Equip end of the second MSP-1 to the Red (+rcv) and Black (-rcv) wires of the cable (9720) furnished with the weather station



6. Ground the bare copper drain wire of the Belden cable to the grounding rod using a brass ground wire clamp.

Note: Do not ground the drain wire at the central end of the cable. Leave it unused.

7. Leave the Black and White pair of wires as spares
8. Connect the other end of the cable (9720) to the **Computer** connection on the white box (containing RAD modem)
9. Connect the RS232 end of the second cable (9721) to the RS232 port of the weather station
10. Connect the other end of the cable (9721) to the **WX Station** connection on the white box
11. Install the white box just below the weather station using furnished U bolt

At the computer...

12. Connect the black (-xmt) wire to the (-xmt) port of the RAD modem furnished with the weather station. Use a small screw driver to open the hole, insert the wire and then tighten with the screw driver
13. Continue with the green (+xmt), red (+rcv) and black (-rcv) wires respectively
14. Connect the RAD modem to a COM port on your computer (it might be necessary to use a 9 to 25 pin adapter)

Installation Procedure

1. Mount a mast/pole 1.25" OD and 8 to 10 feet (312 cm) high on cement base.
2. Place your weather station assembly on top of the mast/pole with the base firmly seated on the top edge of the mast/pole of (see Figure 6)

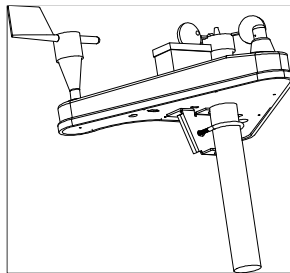


Figure 6 Installation at Pole

3. Loosely tighten the U-bolt nuts so that the weather station is stable but can be rotated on the mast/pole (Figure 7).

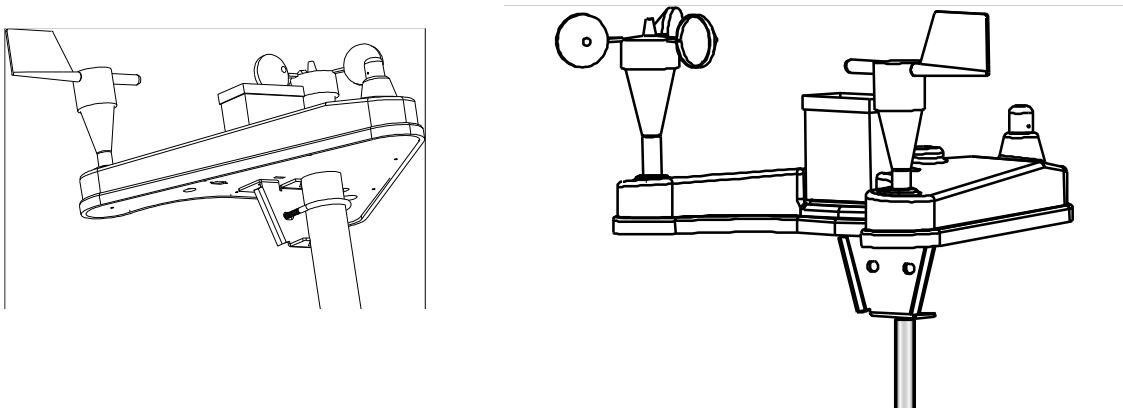


Figure 7 U-Bolt Nuts

4. As a reference, use a compass and rotate the weather station assembly until the reference line on the wind direction sensor is aligned with the Magnetic North (see Figure 8).



Figure 8 Wind Direction Alignment

5. Firmly tighten the U-Bolt nuts
6. Confirm the weather station is level by viewing the bull's level on top of the weather station (see Figure 9). *Minor adjustments can be made by placing shims between the weather station base and the top of the pole.*



Figure 9 Bull's Level on top of the weather station

7. Connect the power source that will recharge the internal sealed rechargeable battery. *For Solar Powered weather stations, follow instructions below.*
8. Remove the red cap from the solar radiation sensor (Figure 10).



Figure 10 Solar Radiation Sensor

9. Properly ground the weather station by connecting a #14 gauge wire to the earth ground lug located on the base of the weather station. Refer to Grounding Recommendations document D31910 for grounding recommendations.
10. Refer to Communication Wiring for direct connect weather stations.
11. Turn the key to the ON position and return to the computer site to confirm the weather station is working properly.

Solar Panel Installation

The solar panel recharges the weather station internal battery. It has a 72 sq. inch surface area and produces 5 watts, at a peak of 17.1 volts.



Figure 11 5W Solar Panel

1. Place the solar panel on the mast below the station to the maximum distance allowed by the solar panel cable.
2. Loosely tighten the U-bolt so that the solar panel is stable but can be rotated on the mast or pole.
3. Use a compass to properly align the solar panel. If your site is in the northern hemisphere, the glass surface of the panel should face south. If your site is in the southern hemisphere, the glass surface of the panel should face north.
4. Connect the cable to the weather station connector labeled Solar Panel
5. Tighten the thumb screw and the U-bolt

