

Weather Report Logger™

Digital Weather Station

WLS-8000

Thank you for purchasing a WLS-8000. Your package should contain a WLS-8000 console, TE wind sensor, solar radiation sensor, temperature/humidity sensor w/pagoda, TE rain collector, serial cable and Weather View Software. The WLS-8000 is unique because it can be programmed and queried by both the buttons on the display and by PC via the RS-232 serial port. Also, 4000 high resolution lines of data can be saved internally or by an external device via its RS-232 port. By accessing the logging mode (press **select** and **time** hold) the user can access previously logged data.

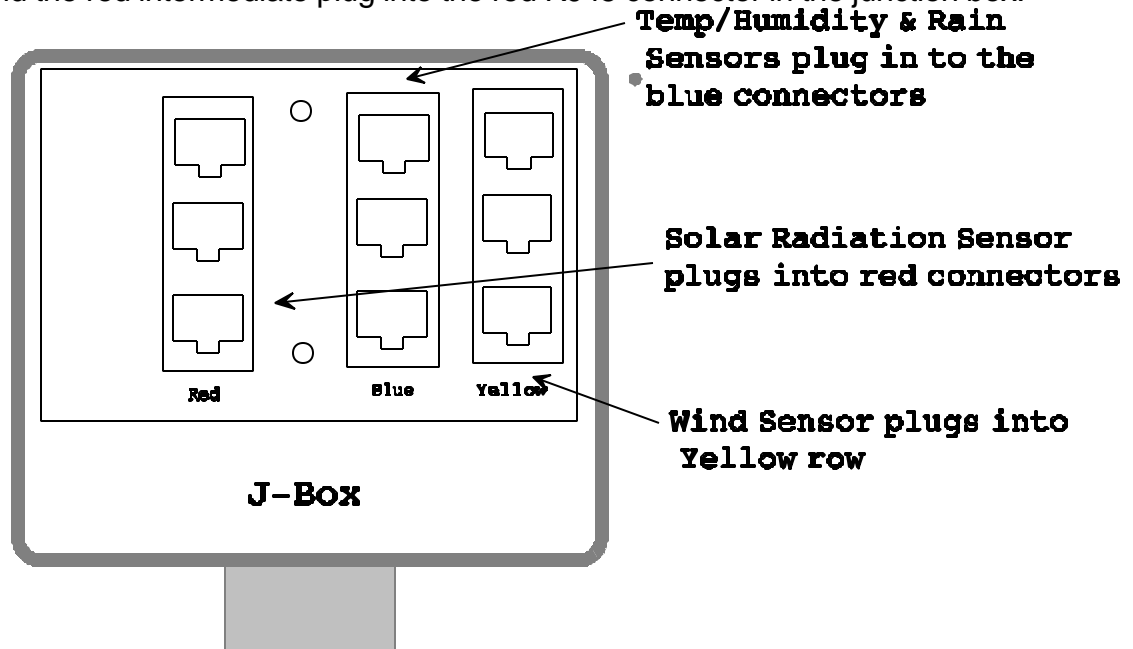
Normal Operation

When in normal operation (no buttons depressed) the instrument displays current wind direction and speed, cycles current time and date, cycles current indoor, outdoor temperature. In addition, if selected, the optional solar radiation or aux temperature is displayed when both the indoor and outdoor indicator lights are extinguished. The unit also cycles current barometric pressure, current relative humidity, and cycles daily, monthly and term cumulative rainfall. By utilizing the hold buttons associated with each display, the user may select the most important readings to the user. During wind speeds in excess of 99 miles per hour a small light turns on between the digits of the wind speed display.

Trend indicators (arrows) are located to the right of the temperature, relative humidity, and barometric pressure displays. If, for example, the current relative humidity is increasing then the up trend arrow appears on. If there is no change in humidity, then the arrow would not appear.

INSTALLATION

The WLS-8000 uses four sensors to gather weather data. The wind direction and speed sensor, the temperature and humidity pagoda, the solar radiation sensor and the rain collector (see figure 1). All are designed to mount to a television type mast (*not provided*). The cables from the sensors go into a junction box, where they connect via RJ45's to three multi-wire cables (intermediates) that are routed into the building and attached to the console. All cables are color coded. The yellow wind sensor cable plugs into the yellow RJ45 connector in the junction box. The yellow intermediate (wind) also plugs into a yellow RJ45 connector in the junction box. Plug the temperature/humidity pagoda and the rain collector (both colored blue) and the blue intermediate into the blue RJ45 connectors in the junction box. You may place any blue cable in to any blue RJ45 connector, the order does not matter. The red solar sensor and the red intermediate plug into the red RJ45 connector in the junction box.



C A U T I O N !! :BE EXTREMELY CAREFUL NOT TO TOUCH ANY HIGH POWER LINES DURING INSTALLATION OF THE VARIOUS SENSORS!!!

There is lightning protection (transient voltage suppressers) built into the junction box. It is very important that the mast be grounded or the transient voltage suppressers will not protect your instrument. The junction box picks up earth ground through the hose clamps mounting the box. We suggest that you install a copper grounding rod (available at Radio Shack) and run the heavy gauge wire directly behind the hose clamps of the junction box. This arrangement will ground your mast and your junction box.

The wind direction sensor is calibrated at the factory and should be installed with the wind sensor arm pointed to the North. The wind sensor can be mounted in any direction and recalibrated via the WLS console, but it is more convenient to use the precalibrated North reference. If calibration is necessary after the unit is already mounted, pick a calm day or immobilize the wind vane by hand and use calibrator mode to make these changes. The outside temperature/humidity pagoda should be mounted about two feet under the wind sensor. Again, we suggest a twenty-foot mast for commercial installations to overcome the artificially high readings generated by a hot roof. Plug the temperature/humidity pagoda cable into the blue RJ45 connector in the junction box.

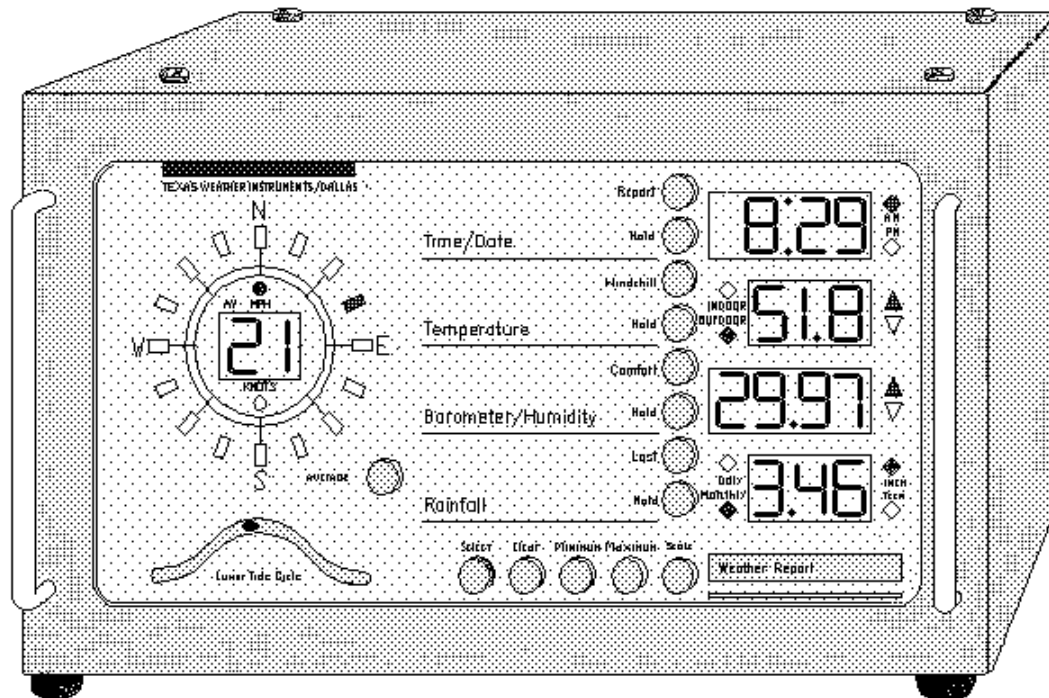
The rain collector is normally mounted on the mast. It should be mounted as low as possible both to reduce windage and to limit movement of the mast, which can cause false readings. The collector should be mounted in a manner that allows rain to enter the collector unencumbered by surrounding obstacles. Use a bubble level to make sure that the collector is perfectly level with the ground. Failure to level the collector will cause inaccurate rainfall readings. The rain collector has one blue cable, which must be connected to the console via the junction box.

Mount the junction box under the rain collector using the hose clamps that are installed on the box (*see figure 1*) and remove the front cover of the junction box. Next insert the connectors from the sensors and the cables from the console through the hole in the bottom of the junction box and then out the front of the box. Plug all the yellow connectors into the yellow RJ45 connectors and all the blue connectors into the blue RJ-45 connectors and then pull the excess cable out of the junction box (j-box). Be sure and replace the rubber gasket on the junction box so that it can remain watertight.

Plug the yellow intermediate cable (wind) into the yellow pigtail exiting the back of the console. Do the same for the blue cable (temp/humidity & rain). Next, plug in the serial cable into the connector in the rear of the console and the proper serial port of your computer. If you are supplying your own serial cable, be sure that either you have a null modem adapter attached to the cable or that the cable is a null modem cable. **The cable supplied with the WLS will have four connectors or will be marked with a green color on one of the cable connectors.** Plug the wall transformer into a 120V wall socket to power up the unit.

The solar sensor must be pointed to the South and must be free of shadows created by the other sensors (Near the top of the mast is normally the best). Take care that the sensor is perfectly level. The solar sensor has one red cable. Run the red solar sensor cable to the junction box and plug it in to the red

connector in the j-box. Run the red intermediate cable to the console and plug it into the j-box.



OPERATION

FUNCTION KEYS

Select The **select** key, when depressed at exactly the same time as the **report** key, puts the unit into time/date and lunar/tide cycle set mode. When the **select** and **scale** keys are depressed at exactly the same time, the unit enters the calibration set mode. When the **select** and **average** keys are pressed at the same time, the unit enters the printer set mode. When **select** and **last** are depressed at exactly the same time the instrument enters rainfall history set. When **select** and **time hold** are pressed at exactly the same time the instrument enters logging mode. When the **select** key is held for 10 seconds, the unit will enter or exit protect mode. Once the instrument is in its respective mode, the **select** key is used to step through the different functions. If the unit is in protect mode, all of these functions are disabled

Clear The **clear** key, when depressed, causes the unit to display the date and time of the last memory clear. Pressing **clear** and **minimum** at the

same time clears the unit's memory. Pressing **clear** and **maximum** at the same time also clears the unit's memory. Pressing **clear** and **last rain** clears the term rainfall.

Minimum The **minimum** key, when repeatedly depressed, steps through wind-speed/wind-direction, temperature, barometric pressure, humidity and rainfall rate, displaying the minimum reading of each of these functions since the last time the unit memory was cleared. In addition to the minimum reading, the unit displays the date and time of its occurrence. The date and time display must not be on hold in order to display both date and time.

Maximum The **maximum** key functions the same as the **minimum** key, but with maximum readings.

Scale The **scale** key changes the displays from reading in English values to those of Metric values. The inch light near the rain display is on when the instrument is in English mode. The English to Metric equivalents are miles per hour or Knots to Kilometers per hour, Fahrenheit to Celsius, Inches of Mercury to Millibars, Inches of rain to Centimeters of rain. Pressing the **select** and **scale** key at the same time puts the unit into calibration mode.

Report Pressing the **report** key sends current data to the serial port. The **report** key, when depressed at the same time as the **select** key, puts the unit into its time setting function. Pressing the **report** key while in logging mode will send all data in memory from the currently displayed record forward to the RS-232 port.

Hold The **hold** key when depressed (toggled on) stops the cycling between two different parameters on the same display.

Windchill The **Windchill** key, when depressed, calculates and displays, using wind speed and temperature, a factor which represents how cold the temperature and wind feel to bare flesh. Pressing the **windchill** and the **comfort** key at the same time will display the dew point.

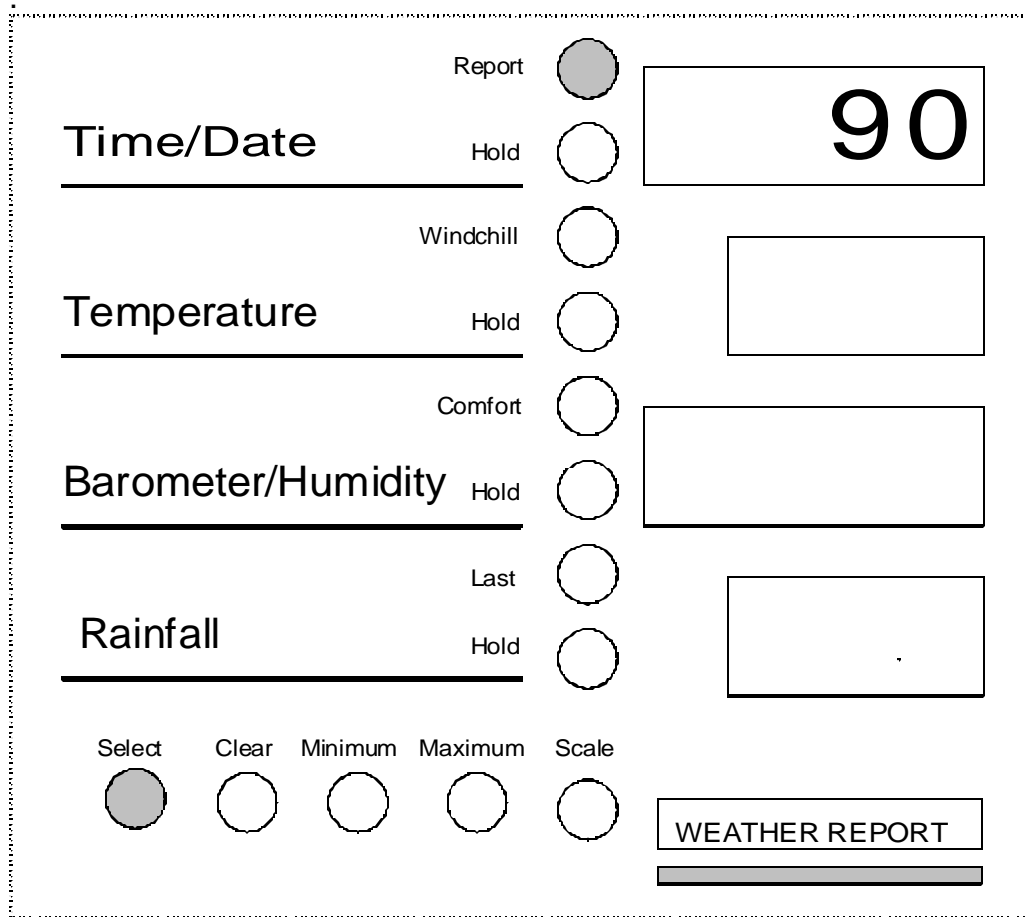
Comfort The **comfort** key, when depressed, calculates and displays, using humidity and temperature, a factor which represents how warm the temperature feels.

Last The **last** key, when pressed, displays the time and date of the last rainfall and its rainfall rate. When pressed at the same time as the clear key, the instrument clears the term rainfall register. When **last** pressed at the same time as **select**, the unit enters into rainfall history mode.

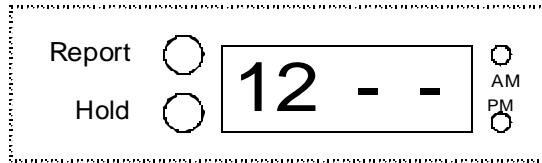
Average When toggled on, the dot below the Av light (near the wind speed display), indicating that the unit is in wind averaging mode. When in wind averaging mode, the instrument displays the previous minute's average wind direction and speed. When pressing the **average** key and the select key and the select key at the same time, the unit enters into the printer set mode.

 **Time Setting Mode:**

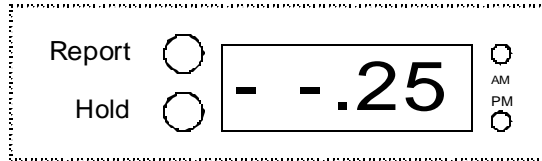
Press **select** and **report** at the same time, and the last two digits of the year displays (i.e., 90 = 1990). Press the **maximum** button to advance the year; the **minimum** button to retard the year.



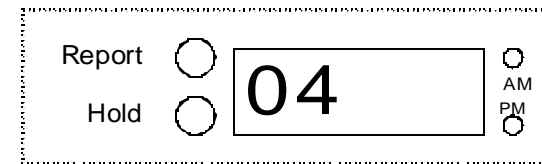
Press **select** a second time, and the month will be displayed (i.e., 1 = Jan. and 12 = Dec.). Press the **maximum** and **minimum** key to set the month.



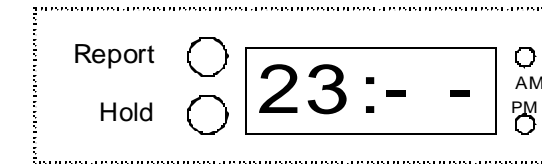
Press **select** a third time, and the day of the month (1-31) digits light. Press the **maximum** to advance the date and **minimum** to retard the date.



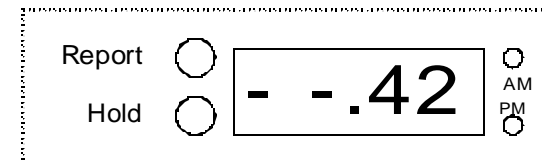
Press **select** a fourth time, and the day of the week is displayed (1 = Sunday, 2 = Monday, 3 = Tuesday, 4 = Wednesday, 5 = Thursday, 6 = Friday, and 7 = Saturday). Press the **maximum** button to advance the day of the week and **minimum** to retard.



Press **select** a fifth time (note the colon between the hours and minutes), and the unit will display the time in military hour style. Press the **maximum** button to advance the hour or **minimum** to retard the hour.

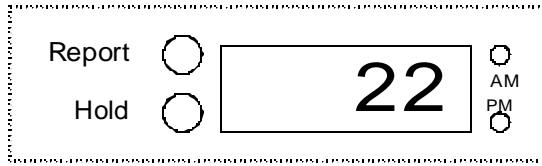


Press **select** a sixth time (note the colon between the hours and minutes), and the unit will display minutes. Press the **maximum** or **minimum** buttons.

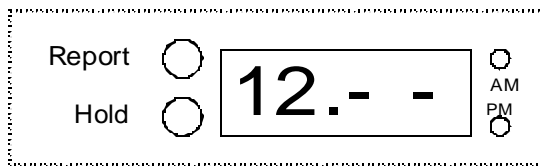


Press **select** a seventh time (note only the right two digits); the unit will display seconds. Press the **maximum** or **minimum** buttons to set the seconds.

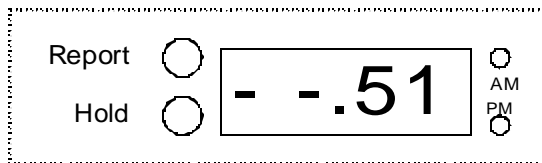
(note: the seconds is updated on the display only when the maximum or minimum button is being depressed).



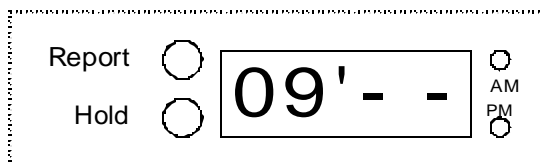
Press **select** a eighth time (a single dot at the bottom separates the hour and minute); the lunar/tide clock will display the number of hours in a cycle. Press the **maximum** or **minimum** buttons to set the hours of the cycle (explained in the Lunar Tide section).



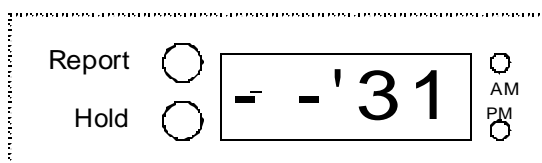
Press **select** an ninth time (the single dot remains at the bottom, separating the hour and minute); the lunar/tide clock will display the minutes of the cycle. Press the **maximum** or **minimum** buttons to set the minutes of the cycle.



Press **select** a tenth time (the single dot is now located at the top, between the hour and minute); the peak of the cycle hour (usually high tide) will be displayed. Change as desired.



Press **select** an eleventh time (the single dot remains at the top between the hour and minute), and the minutes of the peak hour will be displayed. Change as desired.



Press **select** a twelfth time and the unit will return to normal display mode.

Calibration mode

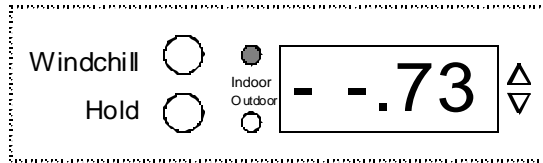
See the calibration reference section for other details.

Calibration Method

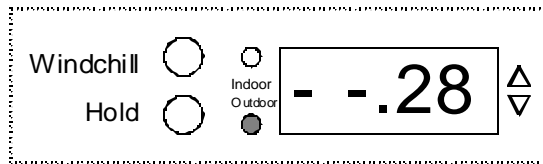
Press **select** and **scale** at the same time, and the unit enters the calibration mode, first displaying the Solar radiation calibration factor. If necessary, press the **maximum** or **minimum** key to enter the proper factor. This factor is located on the back of the instrument.

| | | | | |
|---------------------------------------------|-----------------------|-----------------------|---------------------------------|----------------------------------|
| Time/Date | Report | <input type="radio"/> | <input type="text"/> | |
| | Hold | <input type="radio"/> | <input type="text"/> | |
| Temperature | Windchill | <input type="radio"/> | <input type="text" value="76"/> | |
| | Hold | <input type="radio"/> | <input type="text"/> | |
| Barometer/Humidity | Comfort | <input type="radio"/> | <input type="text"/> | |
| | Hold | <input type="radio"/> | <input type="text"/> | |
| Rainfall | Last | <input type="radio"/> | <input type="text"/> | |
| | Hold | <input type="radio"/> | <input type="text"/> | |
| Select | Clear | Minimum | Maximum | Scale |
| <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| <input type="text" value="WEATHER REPORT"/> | | | | |

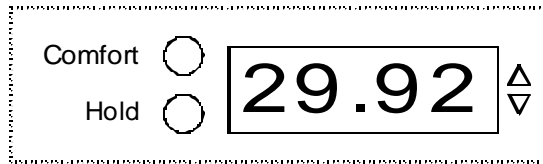
Press **select** a second time and the unit displays the indoor temperature. Press the **maximum** or **minimum** key to enter the actual temperature (*the WLS-8000 temperatures are carefully calibrated at the factory to 0.2 degrees F. We suggest that you not calibrate temperatures because the greatest accuracy that can be achieved using this method is one degree.*)



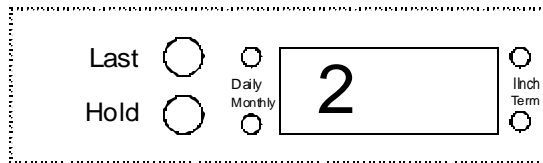
Press **select** a third time - the unit displays the outdoor temperature. Press the **maximum** or **minimum** key to enter the actual temperature.



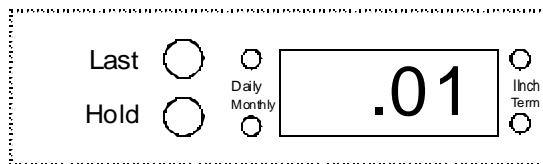
Press **select** a fourth time, and the unit displays barometric pressure. Press the **maximum** or **minimum** key to enter the actual barometric pressure.



Press **select** a fifth time, and the unit displays in the rainfall window: 0, 1, 2, or 3. 2 is the normal display. Press the **maximum** or **minimum** key to enter the proper number (see *calibration reference for more information*).



Press **select** a sixth time; the unit will display in the rainfall window a reading ranging from .01 to .1. Press the **maximum** or **minimum** button to enter the proper number.



Press **select** a seventh time - the unit displays wind direction. Press the **maximum** or **minimum** key to enter the actual wind direction.

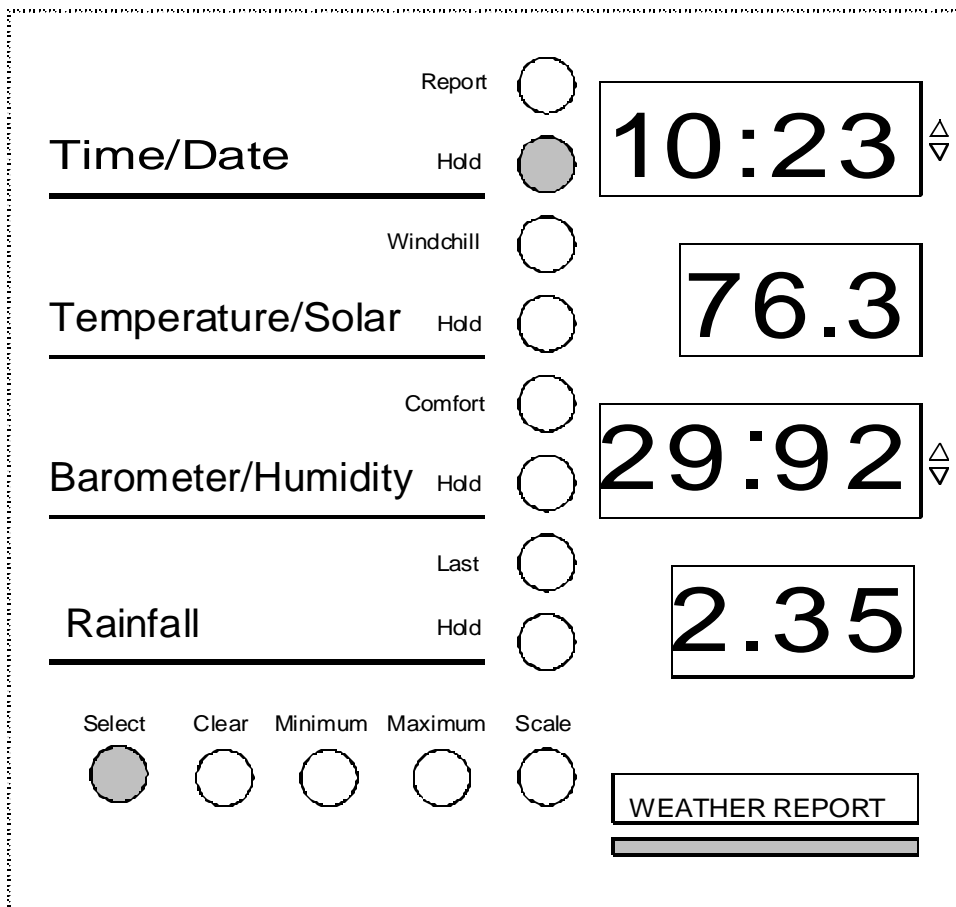
Press **select** an eighth time - the unit will return to the normal display mode.

Humidity Sensor Calibration

This function is only used if a new humidity sensor is installed. Press **select** and humidity **hold** to enter this mode. The first number to appear is the voltage at 0% humidity that the sensor outputs. Press **select** again and a second number will appear. This larger number is the voltage that the sensor outputs at 75% humidity. The humidity calibration numbers are found on the humidity/temperature sensor and on the back of the instrument console. These calibration numbers are supplied to us by the manufacturer of the sensor and are normally not changed.

Logging Mode

Press **select** and **time hold** at the same time to enter logging mode (*note that all the trend indicators are on when in this mode*).



Logging mode allows the user to view previously logged data via the display. (*You can only enter logging mode if there is data in the logging memory*). You may choose at what interval of time you would like the data saved through the *print set* routine. Once in *logging mode* press the minimum and maximum

key to move forward and backward through the data. The date and time of the line of date will be displayed in the *time/date* window. If you have a printer connected to the display, pressing the report key from within the logging mode, directs the WLS-8000 to output data from the data displayed point forward. Press select again to exit logging mode. The WLS-8000 will start writing over the oldest data records in memory with new data, when the capacity of the memory is achieved.

Print Set

There are two settings that will effect the deposition of data. The first, *report interval*, determines how often the WLS-8000 will automatically dump data to the RS-232 port. The second, *log interval*, determines how often the unit saves data to its internal memory.

Pressing **select** and **average** at the same time puts the unit into print set mode. The unit first displays the *report interval* in number of hours between lines of printed information. Press the **maximum** and **minimum** keys to change display.

Pressing **select** a second time displays the number of minutes between lines of information. Press the **maximum** and **minimum** keys to change the display.

Press **select** a third time, and the minimum/maximum and form feed options 0 through 7 may be selected as illustrated in the table below:

| <u>SETTING</u> | <u>MIN/MAX</u> | <u>FORM FEED</u> | <u>RAIN RATE</u> |
|----------------|----------------|------------------|------------------|
| 0 | OFF | OFF | OFF |
| 1 | ON | OFF | OFF |
| 2 | OFF | OFF | OFF |
| 3 | ON | ON | OFF |
| 4 | OFF | OFF | ON |
| 5 | ON | OFF | ON |
| 6 | OFF | OFF | ON |
| 7 | ON | ON | ON |

When rain rate is off, term rain is substituted.

Press **select** a fourth time to select the baud rate of the serial output. Press the **maximum** and **minimum** keys to change the display.

Press select a fifth time to select log interval hours. The log interval tells the *Weather Report* to send data to the internal memory and at what interval to do so. Press the *maximum* or *minimum* to change the display.

Press select a sixth time to select the log interval minutes. Press the *maximum* or *minimum* to change the display.

Press **select** a seventh time and a number between 0 and 255 will appear in the pressure/humidity window which represents **output** options. Enter the proper option number by pressing the *maximum* or the *minimum* keys. The output options control the selection of such things as AM PM, wind speed knots, auxiliary display and average wind speed output. (*Look at the first item in the reference section called control options for more information.*)

Press select a eighth time and the unit will return to a normal display.

Communicating with the WLS-8000

The WLS-8000 via its RS-232 interface can communicate with computers running either the TWICAL program or standard computer communication programs. The WLS-8000 responds to the following ASCII characters sent by computers, with ASCII space delimited text.

Command Characters

V- Firmware version number

S- Firmware Serial#

I- Unit ID number

C- Unit responds with a daily minimum and maximum of all parameters, then clears. The rainfall rate is present rather than term rain.

```
Sample  
MIN 07/24/90 SW 00MPH 000K 067F 067F 054% 30.00" 00.19"D 01.38"M 00.00"R  
MAX 07/24/90 SSE 25MPH 052K 071F 092F 099% 30.06" 00.19"D 01.38"M 00.72"R
```

c- Unit responds with a daily minimum and maximum of all parameters, then clears. The term rain is present rather than rainfall rate. (*Note: use of the either c command will clear the logged min/max.*)

```
Sample  
MIN 07/24/90 SW 00MPH 000K 067F 067F 054% 30.00" 00.19"D 01.38"M 00.00"T  
MAX 07/24/90 SSE 25MPH 052K 071F 092F 099% 30.06" 00.19"D 01.38"M 00.72"T
```

The minimum and maximum associated with the C command is cleared automatically at midnight

D- Unit responds in an identical manner as the C command but does not clear the system memory.

d- Unit responds in an identical manner as the c command but does not clear the system memory

E or e- Unit responds with minimum and maximums along with date and time of occurrence. This uses the same buffer as the c and d command.

M- Unit responds with all term minimums and maximums with the date and time of their occurrence, then clears.

m- Unit responds in an identical manner as with the M command but does not clear the system memory.

| |
|---------------------------------|
| Sample |
| SS 10:33 038K SS 09:32 056 K |
| TO 04:15 075F TI 15:03 080 F |
| TO 10:33 038F TO 16:10 056 F |
| RH 15:44 033% RH 01:40 060 % |
| BP 16:11 29.57" BP 10:20 30.15" |
| RD 04/29 00:00" RT 01:00" |
| RM 03.32" WS 00:00 000 MPH 048 |

The system has two completely separate memory buffers (C and M commands). C is cleared every midnight. M is only cleared by pressing the clear and min buttons on the display or sending an upper case M via a computer.

R- Unit responds with current conditions. The rainfall rate is present rather than the term rain. (Note: in 30.04R the "R" denotes rising pressure)

| |
|----------------------------------------------------------------------------|
| Sample |
| 5:15 07/24/90 SSE 04MPH 052F 069F 078F 099% 30.04R 00.19"D 01.38"M 11.78"T |

r- Unit responds with current conditions. The term rain is present rather than the rainfall rate. (Note: in 30.04F the "F" denotes falling pressure, a "S" character denotes steady pressure.)

| |
|----------------------------------------------------------------------------|
| Sample |
| 5:15 07/24/90 SSE 04MPH 052F 069F 078F 099% 30.04F 00.19"D 01.38"M 00.72"R |

K- Unit responds with current calculated values, for dew point, Windchill and heat index.

Q- Unit response with hi resolution time, wind, temperature and pressure.

| |
|--------------------------------------------------------------------------|
| Sample |
| 96/01/15 09:21:44 SSE 004.3MPH 052.6F 069.2F 078.5F 069% 30.041F 002.19" |

The following commands respond if the WLS-8000 has logged data in memory.

T- Data logger top, moves pointer to the top of the data records, then sends data

N- Data logger next, moves pointer to the next data record, then sends data.

A- Data logger again, sends same data again.

P- Data logger previous, moves pointer to the previous data record, then sends data.

B- Data logger bottom, moves pointer to the bottom of the data records.

Sample

96/03/07 23:00 00052K 053.2F 085.8F 070% 29.926I" 00.00"ID 007.5MPH 342D

date time temp humidity bp rain wind speed direction

REFERENCE

Control Options

Control options can be changed via the console using the print set routine (see *print set mode*). These control options can also be changed using TWICAL software, which is available on www.txwx.com. The first control option is daylight savings mode. When enabled this option will make the weather station automatically change the weather station time in keeping with daylight savings time as recognize in the United States. The second control option is wind speed scale. When turned on, the wind speed is in knots instead of the normal mile per hour or kilometer per hour when in metric scale. The third control option selects the manner in which the time is displayed. 24-hour military style or the AM PM format. When enabled, the AM PM style is displayed. Aux display disable is the fourth option, when it is on the temperature display cycles between the indoor and outdoor values only. If you do not have options such as aux temperature or solar radiation aux display disable should be turned on. Instant wind speed output is the fifth option. When turned on the windspeed output to the RS-232 port is an instant reading rather than a one-minute average.

To turn on the desired control options via the weather station display, refer to the table below, add up the values of the controls that should be turned on and enter that value into the weather instrument via the print set function (see page 12). The default value is 224. For example if you wanted AM PM turned on and instant wind speed output turned on you would add 32+128 which equals 192. Enter 192 into the weather instrument via the print set function.

| Option | Value | |
|--------------------------|-------|--|
| Daylight savings mode on | 8 | |
| Knots on | 16 | |
| AM PM on | 32 | |
| Aux disable on | 64 | |
| Instant wind speed on | 128 | |
| total | | |

You may also change these functions via the software program TWICAL.

RS-232 Interface

The pin out on the RS-232 interface is as follows:

| <u>DE 9 Plug</u> | <u>Header</u> | |
|------------------|---------------|----------------|
| Pin 1 | Pin 1 . . . | |
| Pin 2 | Pin 3 . . . | Receive Data |
| Pin 3 | Pin 5 . . . | Transmit Data |
| Pin 4 | Pin 7 | Data Set Ready |

| | | |
|-------|-------------|-------------------------------------------------|
| Pin 5 | Pin 9 . . . | Signal Ground |
| Pin 6 | Pin 2 . . . | Data Terminal Ready (must be true to send data) |
| Pin 7 | Pin 4 . . . | Clear to Send |
| Pin 8 | Pin 6 . . . | Request Send |
| Pin 9 | Pin 8 . . . | |

Modem Installation

A modem may be used with the WLS-8000 for remote operations. A modem adapter which is available from TWI must be used to properly connect the weather station to a modem. For auto answering, an auto-answering modem with non-volatile memory must be used. The WLS-8000 does not send AT control signals, so in order for the modem to properly answer, the modem must be told (programmed with a computer) to answer on whichever ring the user desires. (Modems pre-programmed in non-volatile memory are available from Texas Weather Instruments.)

Computer Interface

The WLS-8000 with a null modem adapter, may be plugged directly into computers equipped with RS-232 interfaces. Data may be captured to disk by using a communication program (i.e., Crosstalk or Procomm for the IBM-PC) or the TWICA: program. The WLS-8000 sends data in a serial format at 300 to 19.2 baud rate, 8 data bits, no parity and one stop bit.

Note: The WLS-8000 has two separate minimum and maximum memories. Clearing the M command minimum and maximum memory will not affect the C command minimum and maximum memory and vice-versa. The printer/computer memories clear at 12:00 midnight every day and/or when the c key is pressed on the computer console.

Uninterruptable Power Supply

The WLS-8000 has a built-in gel-cell battery which will power the unit in the event of a power failure. The WLS will continue to display, log and output data. After power is restored, the unit will automatically recharge the internal gel-cell battery. (*Note: when the plug connected to the wall transformer is unplugged, the WLS-8000 is disconnected from the battery and the instrument is turned off.*)

Calibration Reference

The WLS-8000 is precisely calibrated at the factory. We strongly recommend that with the exception of Barometric Pressure that the user not attempt to calibrate sensors on their own.

Barometric Pressure

Normally, barometric pressure is the only item that needs to be recalibrated (adjusting for altitude). The proper local barometric pressure can be obtained from the local news. Set the barometric pressure reading you obtained from the local media by using the calibration mode function

Temperature

If for some reason you suspect that the temperature is not calibrated properly, use a quality bulb thermometer with which to calibrate. Remember, the WLS-8000 will be most accurate near the temperature at which it was calibrated. At the factory the WLS-8000 was calibrated to within 1/10 of a degree.

Solar Radiation

The cal number for this sensor is found on the end of the solar sensor plug or etched on the sensor tube.

Humidity Sensor Calibration

The humidity sensor is calibrated by inputting two voltages found on humidity sensor into the WLS-8000. This may be done by utilizing the TWICAL program calibration routine. The humidity calibration numbers are found on the humidity/temperature sensor and inside the instrument console. These calibration numbers are supplied to us by the manufacturer of the sensor and are normally not changed. If it appears that re-calibration is necessary, try increasing or decreasing humidity factor 2.

Rainfall

The WLS-8000 is compatible with most rain collectors on the market today. The *rain flag* is only utilized to tell the WLS-8000 what type rain collector is installed. Actual measurement calibration is accomplished inside the rain collector by adjusting two stainless steel screws. The rain collector is pre-calibrated, do not attempt to calibrated yourself.

Rain Flag Setting 0 turns the rainfall counter off. Setting 1 or 2 tells the WLS-8000 to react with one count for every momentary switch closure of the rain collector.

Setting 3 tells the WLS-8000 to react with one count for every rain collector switch transition from an open or closed state. Rain increment value tells the WLS-8000 how much rainfall to display for each count.

THE PROPER SETTING FOR THE TE 8" RAIN COLLECTOR IS "2" FOR THE COUNT AND ".01" FOR THE MEASUREMENT.

The daily rainfall register is zeroed every day at midnight. The monthly rainfall register is zeroed on the last day of each month at midnight. The term rainfall

register is never zeroed automatically, it must be manually zeroed through the TWICAL calibration routine or by pressing **last** and **clear** on the display at the same time.

Report Flag

The report flag selects the format of the RS-232 output and may be changed via the display using the print set routine or by using the TWICAL program.

| <u>SETTING</u> | <u>MIN/MAX</u> | <u>FORM FEED</u> | <u>RAIN RATE</u> |
|----------------|----------------|------------------|------------------|
| 0 | OFF | OFF | OFF |
| 1 | ON | OFF | OFF |
| 2 | OFF | OFF | OFF |
| 3 | ON | ON | OFF |
| 4 | OFF | OFF | ON |
| 5 | ON | OFF | ON |
| 6 | OFF | OFF | ON |
| 7 | ON | ON | ON |

When rain rate is off, term rain is substituted.

Min/Max, when selected outputs at midnight the minimum and maximum value for the day. The report function must be on in order for the output to occur. This function must also be on if you want the minimum and maximum to be logged to memory.

Form Feed, when selected sends a form-feed character at midnight, which is normally desirable if a printer is directly hook up to the RS-232 interface.

Rainfall rate, when selected outputs rainfall rate instead of term rain in the report function.

Special Key Functions

- Select + Report** = Time Set Function
- Select + Scale** = Calibration Set Function
- Select + Average** = Printer Set Function
- Select + Humidity Hold** = Humidity Calibration Set
- Select + Time Hold** = Logging mode
- Clear + Last** = Clears Last Rain
- Select + Last** = Enters Rainfall History Mode
- Clear + Maximum** = Clears all Maximums and Minimums
- Clear + Minimum** = Clears all Maximums and Minimums
- Clear + Scale + Average** = Performs a cold boot

Windchill + Comfort = *Dewpoint*

Keys must be pressed precisely at the same time to perform the desired function.

Lunar Tide Cycle

The lunar tide cycle function may be set to display the position of the moon in relation to its revolution around the earth. The moon's position is the primary, although not the only, factor in predicting high and low coastal tides. High tides are generally present when the moon is overhead or when the moon is 180 degrees from overhead. Low tide is generally present when the moon is in the 90 degree or the 270 degree position. This method of predicting tide works well on the West and East coasts. On the Gulf coast, this method is not as successful.

To set the tide clock, follow the directions in the time set function. The first item to be entered is the tide cycle duration. The tide cycle duration may be set from 1 to 99 hours. Twelve hours and fifty one minutes is the normal number for a tide clock. The second item to be entered is the time of the high tide. This information is generally found in the newspaper. If predicting the tide does not apply to your area, any cycle that lasts between 1 and 99 hours may be displayed. If you have the optional lighting sensor the lunar tide display does not function as it is replaced with lightning data.

Clearing the Memories

When the **clear** button is depressed and held, the unit will display the date and time the instrument's memory was last cleared. In order to clear the memories, the **clear** and **minimum** button must be pushed at the same time. The items cleared are as follow: minimum and maximum, wind speed, temperature (indoor, outdoor, and aux), barometric pressure and humidity. Daily rainfall is cleared automatically at midnight every night. Monthly rainfall is cleared automatically at midnight on the last day of the month. Term rainfall may be cleared at any time by the user by depressing **clear** and **last** rain at the same time. The term rainfall register may be used for any term desired by the user, but is most commonly used to account for yearly rainfall. The memories can also be changed by using TWICAL.

Rainfall history mode

If the information is available, the actual daily, monthly and term rainfall amounts that occurred before the installation of the weather station may be manually entered. To do so enter the rain history mode, by pressing **select** and **last** at the same time. The first item to appear will be the dally rainfall total. Press **minimum** or **maximum** to input the correct amount. Press **select** again and the monthly rainfall amount will appear. Press **select** again and the unit will display term rainfall, change as desired. Press **select** again and the unit will return to normal mode.

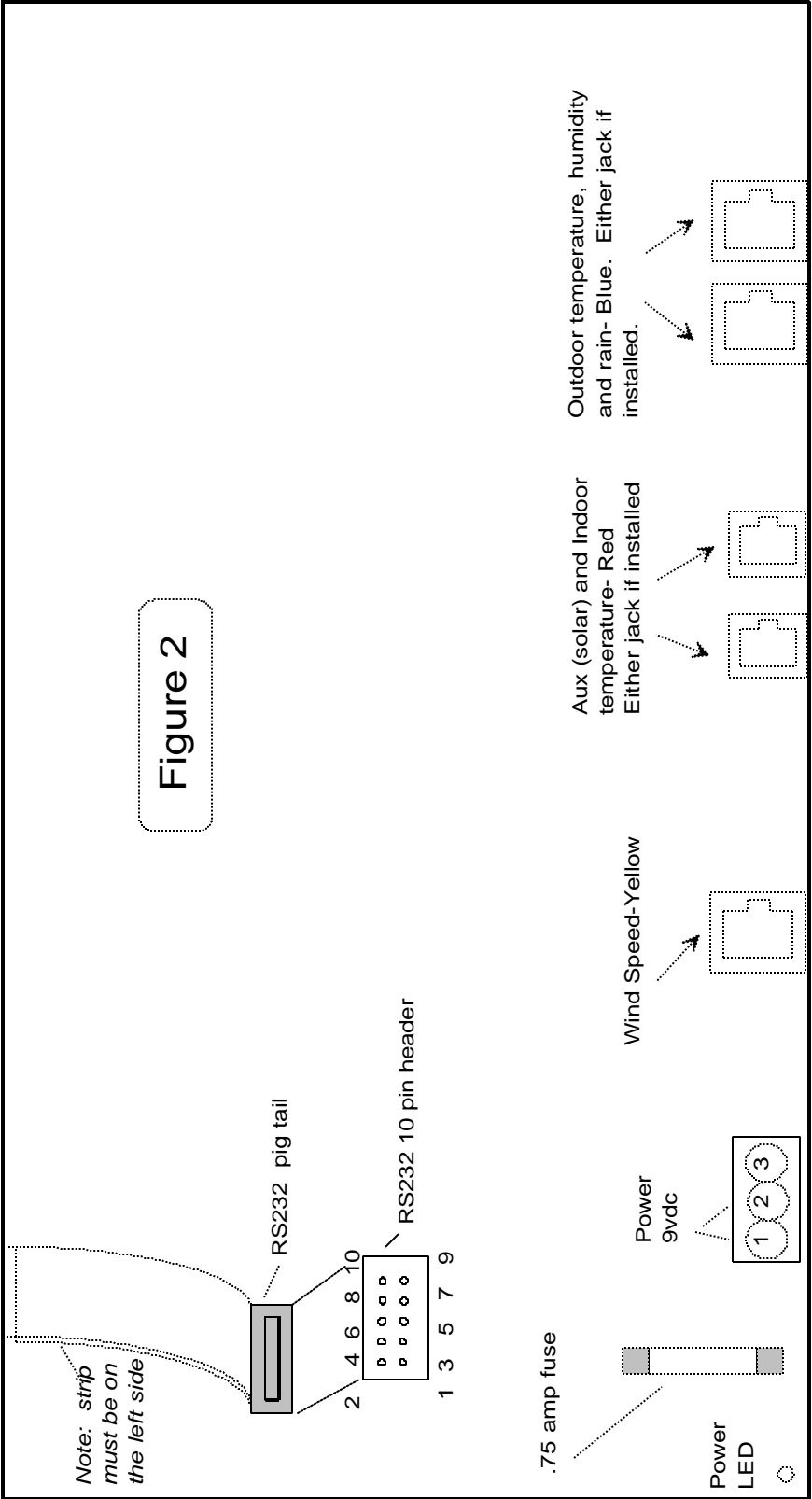


Figure 2

FCC RADIO FREQUENCY INTERFERENCE STATEMENT

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15, Subpart B, of the FCC Rules. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, may cause interference to radio communications.

The limits are designed to provide reasonable protection against such interference in a residential situation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna of the affected radio or television*
- *Increase the separation between the equipment and the affected receiver.*
- *Connect the equipment and the affected receiver to power outlets on separate circuits.*
- *Consult the dealer or an experienced radio/TV technician for help.*

MODIFICATIONS

Changes or modifications not expressly approved by *Texas Weather Instruments, Inc.* could void the user's authority to operate the equipment.

SHIELDED CABLE

Shielded RS-232 cables must be used with this equipment to maintain compliance with FCC regulations.

9/16/97

Troubleshooting

Instrument display does not come on.

Make sure receptacle has power by plugging another appliance into it. Check that the transformer is properly wired into instrument (the leads could be reversed or not seated properly). Check that the fuse is intact (.75 amp fuse inside the case). Try unplugging the transformer to reset the computer.

Instrument display works but does not read correctly.

Make sure you are displaying the proper scale (English or Metric).

Check that all connectors in the back of the unit are properly seated and that sensor wires are on their proper junctions and secure (see to Figure 2).

Try unplugging then replugging the transformer to reset the computer.

Check the fuse in the back of the instrument. If it feels hot, replace with a .75 amp fuse available at most electronic stores.

Rain collector appears to be counting double that of the actual rainfall.

Check that the rainfall count is set on 2.

If you still experience problems, please call (214) 368-7116 and ask for Technical Support, we will be happy to help you.

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