
OPERATION MANUAL

MODEL #'S
525, 550, 600, 700 AND 900ET



Spectrum
Technologies, Inc.

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This manual will familiarize you with the features and operation of your new WatchDog Weather Station. Please read this manual thoroughly before using your instrument. For customer support, or to place an order, call Spectrum Technologies, Inc. at (800)248-8873 or (815) 436-4440 between 7:30 am and 5:30 p.m. CST, FAX at (815)436-4460, or E-Mail at info@specmeters.com.

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GENERAL OVERVIEW

Thank you for purchasing a WatchDog Weather Station.

This manual describes how to use your WatchDog Weather Station and how to keep it working accurately for many years. Read this manual thoroughly in order to make effective use of your weather station.

The WatchDog Weather Station will allow you to record and monitor real-time local weather information at remote sites. Your weather station can also be connected to as many as 4 additional sensors via the external sensor ports. Through the software, simply configure the weather station to record the appropriate sensors.

Download the accumulated data at your convenience using the powerful SpecWare software. SpecWare will present the data in graphical and tabular form. Use the software to calculate growing degree days and chill hours, leaf wetness, temperature and RH hours, or view daily, monthly, and yearly reports. Optional disease and insect models aid the user with Integrated Pest Management decisions. Evapotranspiration calculations to aid in irrigation scheduling are also available with the 900ET station.

INTERNAL SENSORS

Each channel has a data capacity of 3100 measurements. Therefore, a 30 minute measurement interval will allow the datalogger to record for 64 days.

Sensor	Measurement Range	Accuracy
Wind Speed	0-175 mph	±5%
Wind Direction	2° increments	±7°
Temperature	-20° to 70°C -4° to 158° F	±0.6°C ±1°F
(Wind Chill)	-40° to 104°C -40° to 40° F	±4°F ±2°C
Relative Humidity*	20% to 100% @5° to 50° C	±3%
(Dew Point)	-99°F to 140°F -73°F to 60°C	±4°F ±2°C
Rainfall	0.01" (0.25cm) resolution	±2%
Solar Radiation**	1-1250 W/m ²	±5%

- RH and Dew point available on model 550, 700 and 900ET stations only.

** Included with 900ET station. An option on model 525, 550, 600 and 700 stations

EXTERNAL SENSORS

WatchDog Weather Stations have external ports available for external sensor input (Models 525, 550, 600 and 700 have 4, Model 900ET has 3). The following table lists the available optional sensors. All sensors include a 6-foot cable with pin-type connector.

To connect an external sensor to the logger, plug the sensor cable into the logger port that has been programmed for that particular sensor. If the sensor is not connected, the message “sensor error” will appear on the LCD display for the respective logger port until the sensor is connected.

Item #	Sensor Description	Measurement Range	Max # per station	Accuracy
3666	Leaf Wetness	0(Dry) - 15(Wet)	2	N/A
3667 (6ft) 3667-20 (20ft)	External (Soil) Temperature	-30° to 100°C -22° to 212° F	3	±0.6°C ±1°F
3670	Silicon Pyranometer	1-1250 W/m ²	1	±5%
3668	Quantum Light	0-2500 μmol/m ² /s	2	±5%
3669, 3669LT	Soil Moisture Transducer	0-100 kPa (R-type) 0-40 kPa (LT-type)	2	±2%
6450WD (6ft) 6450WD20	Watermark Soil Moisture Sensor	0-200 kPa (WM-type)	3	N/A
3664	20 ft. Extension Sensor Cable	N/A	N/A	N/A
6451	Irrigation Sensor	Switches at 5 psi	1	±1 psi
6471	Barometric Pressure Sensor	26 - 32 in Hg 660 - 810 mm Hg	1	±0.05” ±1.3 mm
3673 3674	Input Cable for User Supplied Sensor	0 - 2.5V 4 - 20mA	3	N/A

Program each port to a specific sensor through the Launch Options Screen in SpecWare software.

ANEMOMETER SETUP



Apart from the anemometer, the WatchDog Weather Station comes fully assembled and ready to mount. The anemometer arm is attached to the enclosure back plate with two clamps. After positioning the arm, the screws should be tightened to secure it in place.

Push the wind cups onto the bottom of the shaft flush with the bottom of the assembly and tighten the set screw. When released, the cups should drop slightly. If the cups do not spin freely, loosen the set screw and lower the cups slightly. The gap between cup hub and assembly should be about 1/16 inch.

Push the wind vane onto the top of the shaft and calibrate (see next page for calibration procedure).



Anemometer clamped to back plate

ANEMOMETER SETUP (CONT.)

Calibrating the Wind Vane

When the weather station is initially placed in the field or moved, the wind direction must be calibrated. The following procedure will allow you to establish accurate wind direction readings.

1. Turn on the display by pressing the **Display** button and press the arrow keys until the wind information is displayed.
2. Rotate the wind vane until it is pointing north.
3. Press and hold the reset button until you hear a steady stream of beeps. The anemometer is now calibrated.

If you are using external sensors, the sensor wires should be run through the bottom of the enclosure by slotting the wires inside the notched plastic cap. Plug the sensor cables into the logger port that has been programmed to read that sensor.

Refer to the **SpecWare Software User's Guide** for more detailed instructions on launching and sensor configuration.

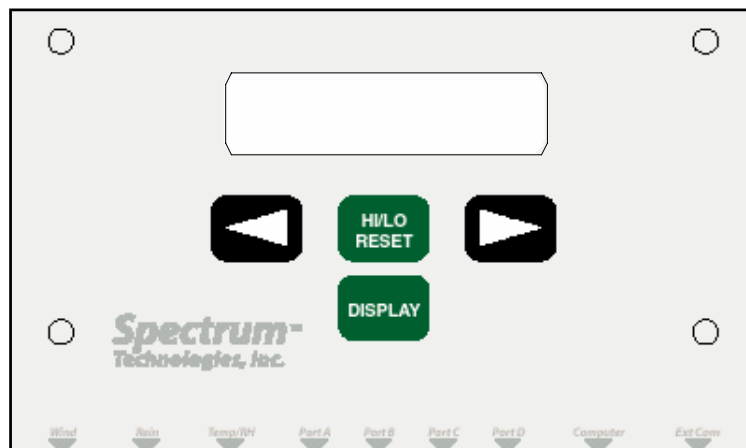
Important: Secure the external sensor wires to the mounting pole with a plastic tie. This will ensure that the sensor wires do not become disconnected while recording.

LCD DISPLAY PANEL

The digital LCD screen displays on-site readings and calculated parameters such as evapotranspiration (900ET station), dewpoint (900ET, 700 and 550 stations) and wind chill. The LCD display is **only** active after the weather station is launched and is logging data. View the LCD to confirm that the logger is working and to observe current weather conditions. The screen will automatically go dormant after 15 minutes. The display can then be turned on or off by pressing the **Display** key.

Sensor readings are updated every 20 seconds. If “sensor error” appears on the display, the external sensor is not connected properly or is not functioning properly. Use the arrow keys to scroll forward or backward through current readings. The scrolling function is temporarily suspended while readings are being updated.

When the station’s logger measurement capacity is reached, the LCD will display “Memory full”. A full logger needs to be downloaded and relaunched before it can collect more data.



LCD DISPLAY PANEL (CONT.)

Sensor Information is displayed as follows:

Wind	Current speed and direction, Maximum gust during last interval
Rain	Total since logger was launched and cumulative since reset
RH, Air Temperature	Current value, Maximum and minimum since midnight (time stamp included with max and min values)
Solar Radiation , WindChill, Dew Pt.	Current value
Evapotranspiration (available on 900ET station only)	Total from last 24 hour period - updated every hour
External Sensors (see pg. 5)	Current value

Hi-Lo/Reset Key

The **Hi-Lo/Reset** is used for viewing time-stamped maximum and minimum values for air temperature and relative humidity, resetting the cumulative rainfall and calibrating the wind direction. Before using the **Hi-Lo/Reset** button, be sure the parameter of interest is displayed on the console. Maximum and minimum values are automatically reset at midnight

To reset the cumulative rainfall reading to zero, press and hold the **Hi-Lo/Reset** button until you hear a steady series of beeps.

To view maximum/minimum values for RH or air temperature, press and release the **Hi-Lo/Reset** button.

See Anemometer Setup (pg. 7) for instructions on calibrating wind direction.

CONNECTING TO COMPUTER

Remotely Located Stations

If you are using the WatchDog Data Shuttle (item # 3679) to interface with your weather station, the weather station's datalogger must be launched by a PC before being installed in the field or if changes (station name, measurement interval or external sensors) need to be made in the logger configuration. Routine download/launch operations can be carried out with a laptop computer or the Shuttle. Refer to the **SpecWare Software User's Guide** for complete instructions on launching and downloading the WatchDog loggers.

When launching or downloading data, connect the station to a computer using the data transmission cable. This cable is included with the SpecWare software package. The data cable connects to an available serial port on your personal computer and the port labeled "computer" on the station.

For remotely located weather stations, the only time you must have the WatchDog connected to the computer is during the launching and downloading of the station.

If the computer will not connect with the station, you may need to change the batteries or change the com port settings. Refer to the **Battery Replacement** section on page 15 for battery instructions.

CONNECTING TO COMPUTER (CONT.)

Direct PC Connection

It is possible to connect you weather station directly to you computer. A direct PC connection cable allows you to monitor the weather station's current weather conditions and perform launch and download operations from an office PC.

With the 6 ft. cable, connect the serial pin to the port labeled "computer" and the 9-pin female connector to the computer data port.

The 100 and 200 ft. cables have modular (telephone-type) connectors on one end and a 9-pin female connector on the other. Plug the modular connector into the port labeled "Aux" on the display console and the 9-pin connector to the computer data port.

Short-Range Modem Pair

The weather station can be hardwired up to 4000 feet from a PC with twisted-pair cable and a short-range modem pair. The cable is connected to the weather station and computer in the same manner as the 100 and 200 ft. direct PC connections.

Caution: Extended lengths of electric cable such as the Direct PC connection and cable connected to a short-range modem pair can attract lightning. It is recommended that the cable be connected to a surge protector (item # 3660SP). This provides upgraded protection against voltage surges caused by nearby lightning strikes.

WEATHER BULLETIN

When the station is hard-wired directly to the computer, it is possible to see current weather conditions by clicking on the **Weather Station Monitor** icon on the SpecWare toolbar or by clicking **Weather Station Real-Time Monitor** under the **Logger** menu. This will bring up a bulletin displaying the current weather conditions. The weather station must be launched and running to send weather data.

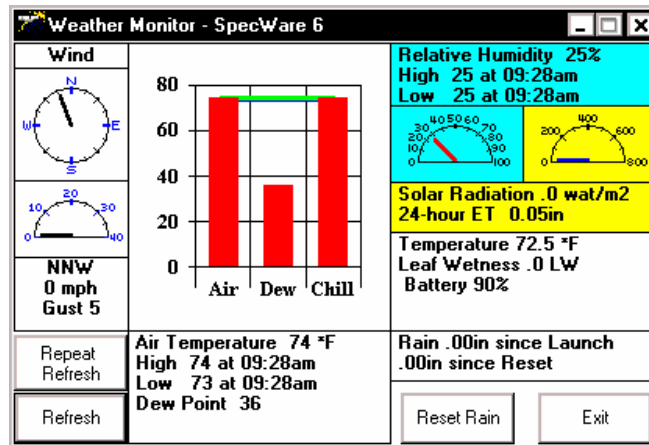


Refresh/Repeat Refresh

The user can view current weather conditions at the station by clicking the **Refresh** button. The auto refresh feature is enabled and disabled by clicking the **Repeat Refresh** button. If enabled, the weather bulletin will be automatically refreshed every 5 minutes.

Reset Rain

Clicking this button resets the cumulative rainfall to zero.



Refer to the **SpecWare Software User's Guide** for complete instructions on accessing bulletin and launch/download functions.

MOUNTING THE WEATHER STATION

The weather station should be located in an open, unobstructed, grassy area to ensure accurate measurement of wind, rainfall, sunlight, and evapotranspiration.

Mounting hardware is provided to attach the weather station to a 4" x 4" treated wooden post or to a mast/pole up to 1.25 inches in diameter. The mounting pole should be securely anchored perpendicular to the ground.

If you are using the mounting tripod (item # 3396TP), open it and place it where the weather station is to be located. The tripod feet can also serve as mounting brackets if the unit is located on a solid surface. Slide the 3' post through both center screw clamps, adjust the height as desired and tighten the screws such that the post is perpendicular to the ground. Finally, attach the weather station to the post with the u-bolts.

Weather Station mounted on tripod



SPECWARE SOFTWARE

To use the WatchDog Weather Station, SpecWare 6.0 software is required. SpecWare software is an integral part of the WatchDog logger family.

- Use SpecWare software to initially program or configure the weather station for the specific external sensors being used.
- Use SpecWare software to launch the weather station to record specified parameters at chosen measurement intervals. Interval choices offered are 1, 10, 15, 30, 60, and 120 minutes.
- Use SpecWare software to read-out and save the logged data.
- Once the data has been downloaded to the computer, SpecWare software offers a wide variety of Report options and Disease and Insect Model options.

Refer to the SpecWare Software User's Guide for more detailed instructions.

Launch Options

Spectrum Technologies, Inc. - WatchDog 03/08/2001 08:39 AM
S/N 5 Model 900 v 1

Data Identification 900ET Station

Measurement Interval 15 Min Maximum Duration 32 Days

Channel	Port	Enabled	Sensor / Units	Reading
1	A	<input checked="" type="checkbox"/>	Temperature (°F)	
2	B	<input checked="" type="checkbox"/>	Soil Moist-WM (kPa)	
3	C	<input checked="" type="checkbox"/>	Leaf Wetness (LW)	
4	Sola	<input checked="" type="checkbox"/>	Solar Rad (wat/m2)	

Wrap around when full (overwrite oldest data)

Delayed Start

MM / DD / YYYY HH : MM : AM

Start Cancel

BATTERY REPLACEMENT

Each WatchDog weather station is powered by four AA alkaline battery cells. The batteries have a life of 8 months continuous use. They are user replaceable and can be purchased locally. The station must be relaunched after the batteries are removed and/or replaced.

Note: The weather station parameters **can't** be changed if the datalogger is relaunched by the Data Shuttle.

To replace the battery:

1. Remove the thumbscrews on the upper cover of the WatchDog (above the LCD).
2. Slide the batteries out of the battery holder.
3. Insert new AA cells.
4. Replace battery cover.
5. Tighten cover screw.

The weather station will beep when the last battery is inserted. This confirms the datalogger is working. The LCD screen will not illuminate until the weather station has been launched.



TROUBLE SHOOTING

Commonly asked questions include:

Q. Why will station not connect with computer?

A. Station needs new batteries, or the com-port settings need to be changed through SpecWare software. Refer to **SpecWare User's Guide** for details.

Q. Why is logger displaying "sensor error"?

A. The logger will display "sensor error" for the external sensors if i.) another external sensor is connected to the port meant to record rainfall or ii.) the sensor is not securely plugged into a channel port.

Q. Why is logger displaying and/or logging bogus, or out-of-range, readings?

A. External sensors may not be plugged into correct ports.

Q. LCD display will not function.

A. Station needs to be launched from a PC with SpecWare 6.0 software

Q. My weather bulletin will not update.

A. Verify that the station has been launched and is currently running.

SERVICE AND SUPPORT

The WatchDog Data Loggers are easy to use and reliable. Should you have a problem, or have questions:

Who do I contact?

Contact the company you purchased the data logger from: Spectrum Technologies, Inc. or an authorized Spectrum Dealer.

When Contacting Spectrum Technologies:

Please indicate that you need Technical Support.

Be prepared to:

1. Provide details on the hardware and software configuration of your components including: manufacturer, model number, peripherals and versions of the operating system.
2. Completely describe the problem. The more information you provide, the faster and more accurately we will be able to respond.

WARRANTY

This product is warranted to be free from defects in material or workmanship for 1 year from the date of purchase. During the warranty period Spectrum will, at its option, either repair or replace products that prove to be defective. This warranty is void if the Spectrum products have been damaged by customer error or negligence, or if there has been an unauthorized modification.

Returning Products to Spectrum

Before returning a failed unit, you must obtain a Returned Goods Authorization (RGA) number from Spectrum. You must ship the product(s), properly packaged against further damage, back to Spectrum at your expense. Clearly mark the RGA number on the **outside of the package**. Spectrum is not responsible for any package that is returned without a valid RGA number or for the loss of the package by any shipping company.

NOTES

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