



# 1000 SERIES DATA LOGGER

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## OPERATION MANUAL

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MODEL #'S  
1200, 1225, 1250, 1400,  
1425, 1450, 1525, 1650



***Spectrum***<sup>®</sup>  
***Technologies, Inc.***

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This manual will familiarize you with the features and operation of your new WatchDog Data Logger. 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](mailto:info@specmeters.com).  
[www.specmeters.com](http://www.specmeters.com)

Spectrum Technologies, Inc  
12360 S Industrial Dr . East  
Plainfield, IL 60585

# GENERAL OVERVIEW

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Thank you for purchasing a WatchDog 1000 Series Data Logger.

**NOTE: All models of the 1000 Series loggers have four external ports. For most models, one or more are not used. They are present on all models to simplify manufacturing and to retain the port plug securely (see below).**

This manual describes how to use your WatchDog Logger and how to keep it working accurately for many years. Read this manual thoroughly in order to make effective use of your data logger.

The WatchDog Data Logger series will allow you to record and visually monitor environmental conditions at remote sites. The WatchDog's liquid crystal display (LCD) eliminates the need to download the data logger to observe current conditions.

These loggers give you the flexibility to change external sensors as your needs vary. Simply plug the sensor into the logger port and configure the logger to the corresponding sensor through the software.

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, and/or view daily, monthly, and yearly reports. Optional disease models aid the user with Integrated Pest Management decisions.

WatchDog 1000 Series Data Loggers require SpecWare 9, version 9.02 or higher. Either the Pro or Basic versions may be used. The Pro version is required for disease models and custom reporting. If you have an earlier version of SpecWare 9, you can download a free update at [www.specmeters.com](http://www.specmeters.com).

The WatchDog logger includes a flexible plug to help guard against insect infiltration through the computer and sensor ports. You can cut the plug along the embossed lines with ordinary scissors to allow for sensor plugs. If you do this, you may wish to connect the smaller remaining parts with light string to avoid losing them if dropped.



# MODEL SPECIFICATIONS

Model	Internal Sensors	External Ports (Channels)
1200	None	2 (A, D)
1225	Temperature	1 (A)
1250	Temperature / Relative Humidity	None
1400	None	4 (A, B, C, D)
1425	Temperature	3 (A, B, D)
1450	Temperature / Relative Humidity	2 (A, D)
1525	Temperature	4 (A, B, C, D)
1650	Temperature / Relative Humidity	4 (A, B, C, D)

Temperature range: -40 to 185°F (-40 to 85°C)  
 Accuracy:  $\pm 1.1^{\circ}\text{F}$  ( $\pm 0.6^{\circ}\text{C}$ ) at -4 to 122°F (-20 to 50°C),  
 else  $\pm 2.2^{\circ}\text{F}$  ( $\pm 1.2^{\circ}\text{C}$ )

RH range: 0 - 100%  
 Accuracy:  $\pm 3\%$  at 77°F (25°C) within 10 - 90% RH, else  $\pm 5\%$

## EXTERNAL SENSORS

All WatchDog 1000 Series logger models except the 1250 have external channels (ports) for additional sensor input. The following table lists some of the available optional sensors. See [www.specmeters.com](http://www.specmeters.com) for a complete list. Most sensors include a 6-foot cable with pin-type connector. Items 3667-20, 6460-20, and 6450WD20 have 20 foot cables.

Item #	Description	Measurement Range	Accuracy
3665R	Tipping Bucket Rain collector	N/A	±2%
3666	Leaf Wetness Sensor	0(Dry) - 15(Wet)	N/A
3667, 3667-20	External (Soil) Temperature Sensor	-40 to 185°F -40 to 85°C	±1.1°F ±0.6°C
3670i	Silicon Pyranometer	1-1250 W/m <sup>2</sup>	±5%
3668i, 3668i3, 3668i6	Quantum Light Sensor and Sensor Bars	0-2500 μmol m <sup>-2</sup> s <sup>-1</sup>	±5%
3676i	UV Light Sensor	0-200 μmol m <sup>-2</sup> s <sup>-1</sup>	±5%
6460, 6460-20	WaterScout SM 100 Soil Moisture Sensor	0% to saturation (typically 50%)	±3%
3669	Soil Moisture Transducer	0-100 kPa	±2%
6450WD 6450WD20	Watermark Soil Moisture Sensor	0 - 200 cbars	N/A
6451	Irrigation Sensor	Switches at 5 psi	±1 psi
3673 3674	Input Cables for user-supplied sensor	0-2.5V 4-20mA	±0.005V ±1%

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

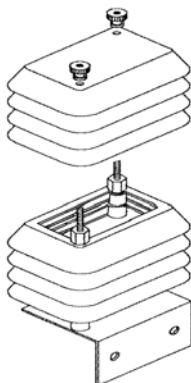
### **Port A is the only channel that will record rainfall data**

Program each channel (port) to a specific sensor through the SpecWare launch screen. Refer to the **SpecWare Software User's Guide** for more detailed instructions on launching and sensor configuration.

# INSTALLATION AND PLACEMENT

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WatchDog loggers, or mini-weather stations, have the versatility to be located in any micro-climate for recording weather data. The optional sensors and radiation shield include hardware for attaching them to a 1" to 1¼" (2.5-3cm) outside diameter mast (pipe). Use a 5' - 10' (2-3m) length of conduit or pipe as the mast mount. When purchasing and/or cutting the mast to size, plan on placing 1½' - 2' (0.5m) of the mast into the ground. Refer to the illustration as an example of how to install your "mini-weather station."



For outdoor and greenhouse use, the WatchDog logger must be placed in a radiation shield to protect it from solar radiation and other sources of reflected heat. The radiation shield also protects the logger from rain. Place the WatchDog inside the radiation shield by unscrewing the two finger-nuts and removing the top of the radiation shield.

**Important:** Secure the external sensor wires to the mast just below the radiation shield with a plastic tie. This will insure that the sensor wires do not become disconnected while recording.

## DIGITAL DISPLAY

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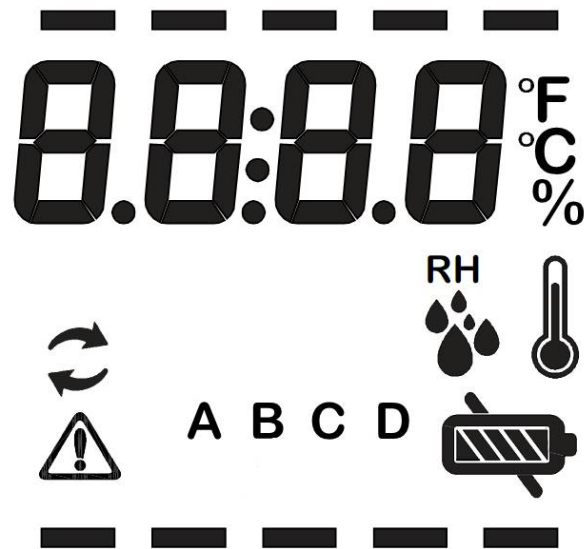
The digital LCD display is a key feature of the WatchDog 1000 Series loggers. A visual display of the on-site readings correlates to the sensor configuration of the logger.

Press the button to the right of the LCD to read all the sensors and activate the display. The display will cycle through all sensors four times, then shut off. The displayed sensor values will not be updated unless you press the button again.

The A, B, C, D indicators will light to identify any external sensor values. If dashes (“—”) are displayed, a sensor is not plugged into the port. For logger models with internal sensors, the temperature and RH icons will light when their values are displayed.

If the “Sync” icon (the two circular arrows) is lit, it means the logger is full and no longer recording data. The logger must be connected to a data shuttle or a PC running SpecWare to download the data and begin logging again.

The battery icon displays the relative battery life remaining. At the lowest level, the diagonal bar lights to indicate that there is almost nothing left.



## CONNECTING TO THE COMPUTER

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To launch and/or download data from the logger, connect the logger to a computer via 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 with the computer icon (arrow below) on the logger. If your computer does not have a serial port, you will need a USB to Serial adapter cable, such as item 3661USB from Spectrum Technologies.



*The **only time** you must have the WatchDog connected to the computer is during the launching and downloading of the data logger. After the logger has been launched, and/or downloaded, disconnect the logger and place it in the environment you wish to monitor.*

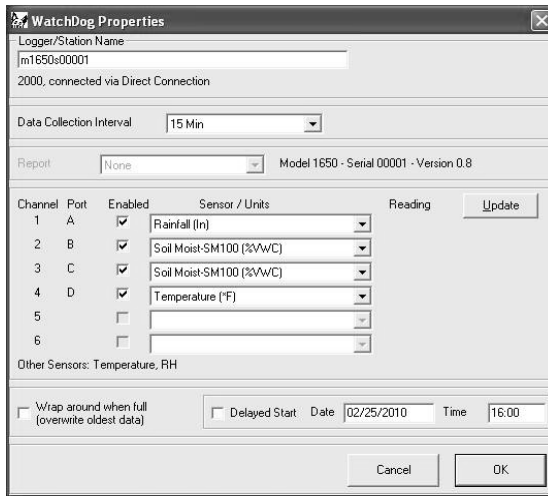
If the computer will not connect with the logger, you may need to change the battery or change the comm port settings (see the **SpecWare Software User's Guide**).



# SPECWARE SOFTWARE

To use the WatchDog Data Logger, either the Pro or Basic version of SpecWare software v9.02 or higher is required. SpecWare software is an integral part of the WatchDog logger system.

Use either the WatchDog Manager or the Launch / Properties toolbar button to initially program or configure the logger for the specific external sensors being used.



Channel	Port	Enabled	Sensor / Units	Reading	Update
1	A	<input checked="" type="checkbox"/>	Rainfall (In)		
2	B	<input checked="" type="checkbox"/>	Soil Moist-SM100 (%W/C)		
3	C	<input checked="" type="checkbox"/>	Soil Moist-SM100 (%W/C)		
4	D	<input checked="" type="checkbox"/>	Temperature (°F)		
5		<input type="checkbox"/>			
6		<input type="checkbox"/>			

On the Properties screen, set the measurement interval, ranging from 1 to 60 minutes. The 1000 Series logger has a capacity of 10,500 intervals, so it can record 209 days of data at a 30 minute interval.

When “Wrap around when full” is checked, then the 1000 Series logger retains all 10500 data intervals, erasing the oldest each time it records a new data point. In

this mode, the logger never has to be relaunched - it just keeps recording data. If “Wrap around when full” is NOT checked, old data will be erased before the logger begins recording.

Use either the WatchDog Manager or the Download toolbar button to download 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 Model options. Refer to the **SpecWare Software User’s Guide** for more detailed instructions.

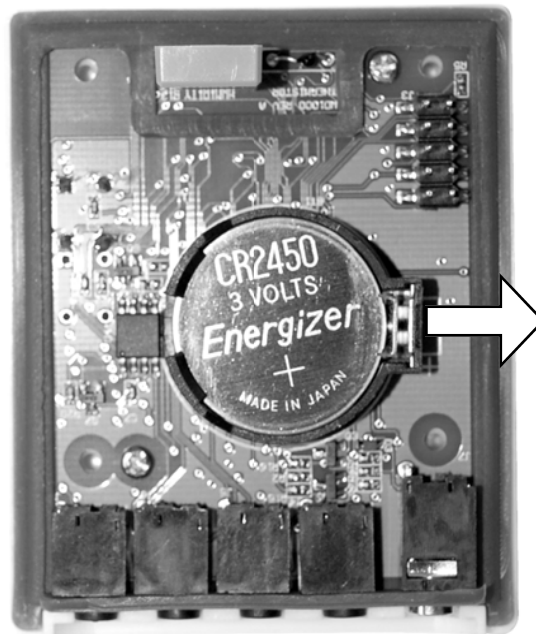
# BATTERY REPLACEMENT

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Each WatchDog Data Logger is powered by a 3 Volt CR2450 battery. The battery has a life of 12 months continuous use, and a 2-year shelf life. Battery life can be affected by extreme temperatures. The battery is user replaceable and can be purchased locally.

To replace the battery:

1. Remove the four screws from the back cover of the WatchDog.
2. Remove the back cover.
3. Squeeze the battery clip in the direction of the arrow below. If the battery does not pop up, press down on the opposite side at the same time.
4. Insert a new CR2450 battery, positive (“+”) side up.
5. Confirm that the logger is working by checking if the black bars at the top and bottom of the LCD light for a few seconds.
6. Replace the back cover. Insert and tighten the four screws .



# TROUBLE SHOOTING

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Commonly asked questions include:

- Q. Why will the logger not connect with my computer?  
A. Most commonly, the data logger needs a new battery, or the SpecWare comm port settings need to be changed (in SpecWare Preferences). Refer to SpecWare User's Guide for details.
- Q. Why will the logger not record rainfall?  
A. Make sure rainfall sensor is plugged into port A, and that Port A is configured for rainfall through the launch screen.
- Q. Why is logger displaying "- - -"?  
A. The logger will display dashes for the external sensors if 1.) the rainfall sensor is connected to the wrong port 2.) another external sensor is connected to the port meant to record rainfall or 3.) 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. The external sensors are not plugged into the correct ports.

# SERVICE AND SUPPORT

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The WatchDog Series 1000 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

The WatchDog 1000 Series Data Logger is warranted to be free from defects in materials and workmanship for a period of 1 year from the date of original 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 product has 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) with the RGA number marked clearly 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.

	<b>DECLARATION OF CONFORMITY</b>
	Spectrum Technologies, Inc. 12360 S. Industrial Dr. East Plainfield, IL 60585 USA
Model Numbers:	1200, 1225, 1250, 1400, 1425, 1450, 1525, 1650
Description:	WatchDog Data Loggers
Type:	Electrical equipment for measurement, control, and laboratory use
Directive:	2004/108/EC
Standards:	EN 61326-1:2006 EN 61000-4-2:1995, including A1:1998 and A2:2001 EN 61000-4-3:2002 EN 55011:2007
	
Michael J. Dunning, Weather Products Manager	January 27, 2010

**Spectrum Technologies, Inc**  
**12360 S. Industrial Dr. E**  
**Plainfield IL 60585**  
**(800) 248-8873 or (815) 436-4440**  
**Fax (815) 436-4460**  
**E-Mail: [Info@specmeters.com](mailto:Info@specmeters.com)**  
**[www.specmeters.com](http://www.specmeters.com)**