WatchDog®

Data-Logging Rain Gauge

Item # 3554WD1

Spectrum® Technologies, Inc.

Thank you for purchasing a Spectrum Datalogging Rain Gauge. With proper installation and care, it will give you years of accurate and reliable measurements. This instruction manual takes you through the procedures required to set up and use the Datalogging Rain Gauge. Read it thoroughly to insure proper and effective use of the sensor.

The datalogger records rain activity over time when connected to a tipping-bucket type rain collector. The logger records accumulated rainfall during each interval (maximum of 10.23" per interval).

Specifications:

Type: Self-emptying tipping bucket
Resolution: 1/100 inch (0.254mm)
Accuracy: ±2% with rainfall at < 2 in (5 cm) per hour
Event type: Tip (relay contact opening)
Event intervals: 1, 5, 10, 15, 30, 60
Capacity: 10584 intervals; with a maximum of 10.23" (260mm)
                 per interval
Battery: CR2450 (replace every year)

Verifying the Rain Collector is Recording Data

Requires Specware 9 Basic or Pro (Build 247 or later)

1. Remove the rain funnel from the base of the unit (see page 3). The funnel MUST be removed in order to test the rain collector.
2. Connect the PC interface cable to the logger. Connect the sensor cable to the sensor port adjacent to the PC port.
3. Open Specware
4. Click on the "Launch/Set Properties for WatchDog 1000 or 2000 Series.
5. Verify port A in the properties screen is Enabled, Sensor/Unit is Rainfall, and click on the Read Sensors button.
6. Manually move the tipping spoon back and forth five (5) times.
7. Click on Read Sensors button a second time.
8. Verify the reading for Rainfall has incremented accordingly.

SENSOR

PC

WatchDog Properties
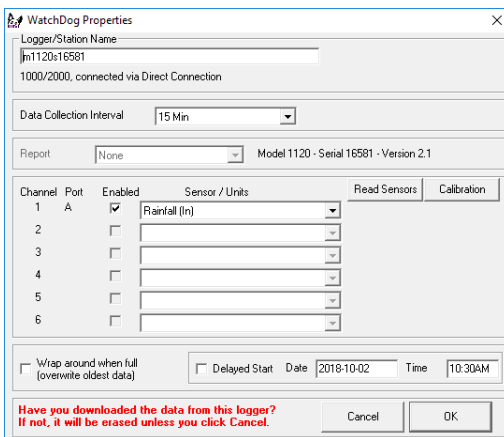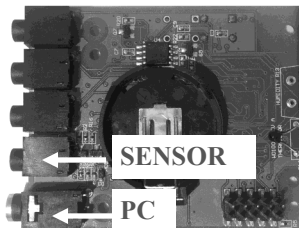
Assembly

The aluminum mounting bracket needs to be attached to the rain collector. Turn the collector upside down. Note the four holes (circled at right) that will be used for screws to attach the bracket.

Set the bracket on the collector, lines up the holes in the bracket with those in the collector. If only two of the four holes line up, rotate the bracket 1/4 turn. Attach the bracket to the collector using the four machine screws included.

The datalogger is enclosed in a storage cavity under the collector cone (see below). To access the logger, loosen the four screws which secure the cone to the base. Rotate the cone from the base until the screws are free from the latches and separate the cone from the base. Remove the colored cap from the cylindrical cavity and remove the datalogger (it may be disconnected from the right-angle connector at any time).

Use SpecWare software to program the WatchDog to log rainfall. Connect the logger to your PC using the interface cable provided with the software. Measurements can be recorded in metric or US units. Refer to the SpecWare User's Guide for detailed launch and/or readout instructions.

Installation

When choosing a location for your rain collector, keep the following in mind:

- Verify data is being recorded prior to installing—refer to page 2.

- Mount the collector on a 1" - 1.25" (25-32mm) mast (pipe) using the provided u-bolts, or a wooden post using the screws.

- Make sure the collector is level when positioning the mast mount. Use a bubble level to check that the collector's base is level.

- The post or mast MUST be rigid. If the collector moves easily, the wind can create oscillations that may record extra tips, resulting in higher-than-actual rain measurements.

- The gauge contains a magnet-operated switch which may not operate correctly if you mount the rain collector on or near any object which attracts a magnet.

- To ease normal cleaning, choose an easily accessible location that is far from trees and other sources of pollen or debris.

- The rain gauge must be located in an open area.

Maintenance

Inspect the collector frequently to make certain it is still level and clear of obstructions.

For greatest accuracy, you should thoroughly clean and calibrate the rain collector at least once or twice a year. Remove the collector cone to clean the tipping bucket using a mild detergent and respraying with "Elmer's Slide-All". This teflon spray can be obtained at your local hardware store. Note: Disconnect the logger from the rain collector to avoid any inadvertent counts on the logger when cleaning.

Troubleshooting

Unable to contact the logger in SpecWare

1. The most likely cause is a low battery in the logger. Replace the battery with a fresh one using the instructions in the Battery Replacement section.

2. See the SpecWare Quick Start Guide or User Guide for instructions concerning assigning communications ports.

The logger is reading low, or not at all

1. Check the inside of the rain bucket for debris such as leaves that may be blocking the grid at the bottom of the bucket. Remove the rain bucket from the base and check for any obstacles (spider webs, debris, etc.) that may be preventing the tipping spoon from moving freely. If the hole beneath the grid gets clogged with dirt, the cotter key can be removed to allow it to be cleared.

2. Check that the rain sensor is connected to port A (see pg. 2).

3. Launch the logger, setting it to one minute intervals, so it can count the rain measurements.

4. Manually move the tipping bucket back and forth several times (counting the tips). After a minute, download the logger and check if the tips have been recorded. Do this several times.

5. If the tips are being counted correctly, but the logger is reading low, go to the Calibration section (p. 7).

6. If the logger is not registering any or all of the manual tips of the bucket, it may be that the magnet on the tipping bucket (the black bulb) is too far from the reed switch (located on the small green circuit board). There are 2 cams on the base of the rain collector that hold the tipping bucket axle in place. These can be rotated to move the tipping bucket closer to or further away from the reed switch. Loosen the screws slightly, and rotate the two plastic disks clockwise to bring the magnet closer to the reed switch, or counterclockwise to move the magnet and switch further apart. Repeat the test in steps 2 and 3. If the logger can now detect the correct number of manual tips of the bucket, then proceed to the Calibration section, if required.

7. If, after performing step 5 the logger is still not registering any or all of the manual tips of the bucket, it is likely that either the reed switch or the sensor cable is not functioning. Please contact Spectrum Technologies for service or replacement parts.

__The logger is not reporting the same results as another rain gauge__

There may be nothing wrong. Rainfall is extremely variable, over even short distances.

Iowa State University Extension agronomist Mike White measured rainfall in 17 locations within a 40 acre field for two growing seasons. Total seasonal rainfall varied within the field from 9.65 to 11.48" in 1997 and from 11.84 to 13.43" in 1998. These numbers were for an entire season so individual storm differences could begin to cancel each other out. So one can expect noticeable differences between two rain gauges even a short difference apart.

Calibration

If the rain gauges are differing over a very short distance, then calibration may be necessary. Calibrate the tipping bucket rain gauge only after performing the steps in the maintenance section of this manual.

1. Launch the logger, setting it to one minute intervals, so it can count the rain measurements.
2. Measure 84 ml of water into a Zip-Lock bag.
3. Puncture the bag with a pin and place it in the bucket so the water will slowly enter the bucket.
4. When the water has drained out, remove the logger and download the data. 84 ml of water should register 0.10 inches of water (2.5 mm). This is equivalent to 10 tips of the tipping spoon.
5. If greater measurement accuracy is required, use 840 ml of water, which should register 1.00 inches (25.4 mm), and is the equivalent of 100 tips of the tipping bucket.

Battery Replacement

The datalogger is powered by a 3 Volt CR2450 battery. It is user-replaceable and can be purchased locally.   We recommend changing the battery every year.

To replace the battery:
1. Remove the logger from the storage cavity and unplug the 2.5 mm sensor cable.
2. Slide the plastic cover gently upward to expose the battery holder
3. Slide the battery out of the battery holder.
4. Insert a new CR2450 battery positive side up.
5. Slide the plastic cover back over the electronic board.

Insert a flat-edged screwdriver completely underneath old battery. Gently lift edge of battery over casing lip and slide battery out.
Slide new battery into battery casing.
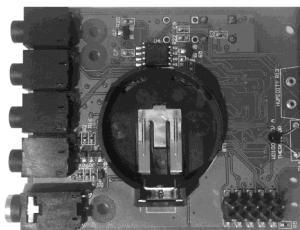
Warranty

This product is warranted to be free from defects in material or workmanship for one 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 does not cover damage due to improper installation or use, lightning, negligence, accident, or unauthorized modifications, or to incidental or consequential damages beyond the Spectrum product. Before returning a failed unit, you must obtain a Returned Materials Authorization (RMA) from Spectrum. Spectrum is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company.

DECLARATION OF CONFORMITY

Spectrum Technologies, Inc.
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CE

Model Numbers:	3554WD
Description:	Datalogging Rain Gauge
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 16, 2009

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Rev. 05/19