



Odyssey Tipping Bucket Rain Gauge Logger.

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Introduction.

The Odyssey tipping bucket rain gauge logger is designed to interface with a Davis Tipping Bucket or other compatible model (please check with the manufacturer). This logger records the time of each bucket tip generating true rainfall intensity data.

Installation & Testing.

The rain gauge installation details are included in the DAVIS Rain Collector handbook.

The recorder and tipping bucket must first be tested to ensure that the system is working.

Remove the cable tie holding the tipping buckets in the shipping position.

Using the Odyssey software click on the PROBE TRACE MODE icon and select the TIPPING BUCKET RAIN GAUGE sensor from the sensor option list.

Gently tip the rain gauge bucket until it drops to the opposite side. The recorder will detect the bucket tips and send the data to the computer each time you tip the bucket.

The tipping time will be displayed on the computer screen.

Calibration.

The orifice of the rain gauge is 6.5 inches or 165.1 millimeters. Before calibrating the rain gauge makes sure the bucket surfaces are clean.

The standard calibration is in millimeters. The Davis tipping bucket may be set up in imperial or metric measurements. *Ensure that the metric measurement adaptor has been fitted.* Instructions are in the Davis manual supplied with the rain gauge.

Open the Tipping Bucket Rain Gauge calibration file in the Odyssey software. Measurement units are in mm. Enter the following data in the calibration table.

	Un-calibrated Value	Measured Value
First Value	0	0
Second Value	233	46.6
Relative Value	0	
No. Decimal places		

Finally, save the calibration file.

The Davis Tipping Bucket Rain Gauge is factory calibrated and should not normally require any attention other than keeping it clean. The mechanical adjustments should not have to be altered. If the calibration appears to be significantly in error, put a calibrated rain gauge of at least 100 mm diameter within 600 mm of the one under test and compare the readings over a period of time. A significant rainfall event will give the best results.

Calculate the number of tips by first downloading the logged data and then editing the site data and recording the number of scans.

Each scan represents one tip. The column R.G.Tip also shows each tip. Enter the number of tips in the un-calibrated column and the rainfall measurement in the measured value column of the Calibration File.

Alternative Method of Calibration.

The following method of calibration may be used; however its accuracy leaves much to be desired as the drip rate can sometimes flood the buckets giving far fewer tips than what is expected.

A plastic container big enough to hold one litre of water is required to carry out a calibration. The container should have a 1mm hole drilled in the bottom of the container at the lowest point, if the base of the container is not flat.

A site file must be set up before the calibration can be started. Refer Odyssey Data Logging Software manual to set up a site file.

To carry out the calibration the recorder must be started. Refer 'Set up and Start Logger' section of Odyssey Data Logging Software manual.

Unplug the serial cable from the logger and screw the cap back on.

Place the rain gauge onto an area where the water that drains from the gauge will not cause a problem. Place the water container into the cone and tip 1 litre of water into the container. The bucket should start tipping within a few seconds. The tip rate should be approximately one tip every five seconds.

The calculation to determine the number of tips is as follows:

- Radius = 8.255 cm
- Area of rain gauge orifice = $\text{Pi} * 8.255^2 = 214.08$ square cm
- 1 mm of rain = 21.408 cc of water
- The number of bucket tips per 1 cm of rain = $10 \text{ mm} / 0.2 \text{ mm} = 50$

The number of bucket tips for 1 litre of water, if the rains gauge calibration is perfect, should be:

$$(1000/214.08) \times 50 = 233$$

Each bucket tip should be 0.2 mm of rain so that the calibration rainfall value is

$$233 \times 0.2 = 46.6 \text{ mm}$$

When all the water from the container has emptied into the rain gauge, the recorder must be downloaded into your computer. Plug the serial cable into the Odyssey recorder and click on 'Stop Logger and Save Data'. Then select the site that was used to set up the recorder for the calibration.

When the data has been loaded, click on Data Worksheet. The recorded data will now be displayed on the screen. The number of scans counted in the left hand column represents the number of bucket tips. Enter this value into the UN-CALIBRATED second value of the calibration file, and 46.6 into the MEASURED second value. Now enter 0 for the first reading in both the UN-CALIBRATED VALUE and the MEASURED VALUE in the calibration file. Finally, save the calibration file.

Memory Storage Capacity.

The logger records the current time of day every time the bucket tips. This is stored as a three-byte number. At midnight every day a midnight flag is recorded. A 0.2mm rain gauge would record approximately 21500-bucket tips, which is 4300 millimeters of rain.

When the memory is full the recorder shuts down.