

STORM Guardian Operator's Handbook

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Introduction

Casella Tipping Bucket Rain Gauges are reliable and extremely robust devices. When paired with a Casella LOG 8 telemetry data logger they have the ability to take measurements from a single or a multi-parameter sensor at regular intervals, and stores this data in internal memory. This instrument will from here on in be referred to as STORM Guardian.

Using GPRS or GSM telemetry, the LOG 8 contacts a data collection system, typically once per day, and transfers data to the data collector.

The LOG 8 can also be configured for alarms with user-specified set points. When a measurement exceeds a set point, the LOG 8 contacts the data collector and transfers data along with an alarm message. The alarm message is typically *forwarded* by the data collector as an email or an SMS message.

The LOG 8 manages power to both the modem and sensors. An external battery is needed, in the range of 3.6V to 20V. This battery charges and internal rechargeable cell (an HLC) which will run the system for a short period during battery changing.

The battery and sensor connect via a 6-way screw connector, which is protected by a piercable sealing grommet.



Figure 1: The Tipping bucket rain gauge with the outer cover removed.

Principle of Operation

The rain gauges comprise a light weight injection moulded plastic divided tipping bucket assembly with stainless steel pivot pins that rest upon stainless steel pins in the support assembly. The use of pins produces a rolling rather than pivoting motion when the bucket tips, which reduces the likelihood of friction.

Rain collects in one side of the bucket, which tips once a predetermined volume of water has been collected. The tipping action discharges the collected water and positions the other side of the bucket under the discharge nozzle ready for filling.

Each time the bucket is tipped, a magnet within the bucket moulding closes a reed switch in the support assembly. The use of a sealed reed switch, capable of indefinite operation, ensures the instrument has a long working life. Each contact closure pulse represents a discrete amount of rainfall appropriate to the instrument's calibration. These tipping pulses may be counted or recorded using a variety of methods, as described in Chapter 6.

The tipping bucket mechanism is mounted inside the body on a cast aluminium-alloy base, incorporating a built-in spirit level to facilitate correct positioning. Both body and funnel are manufactured from aluminium alloy, with an accurately machined septum ring with an aperture of 400 cm². (200cm² version is now also available) The measurement accuracy for the various tip sizes is shown in Figure 2.

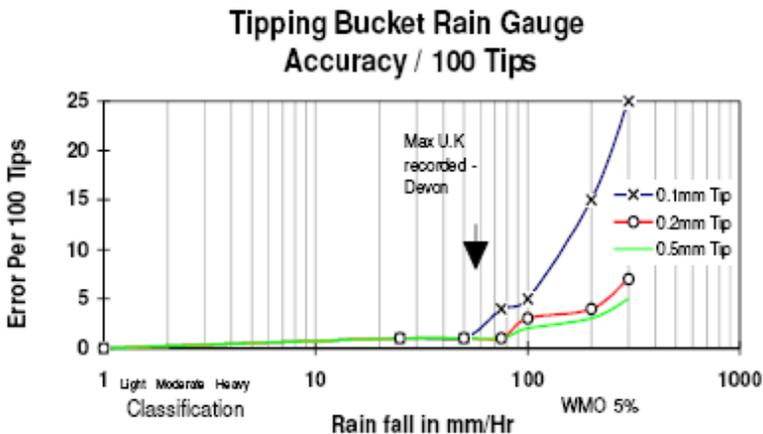


Figure 2: Accuracy of 0.1 mm, 0.2 mm and 0.5 mm tip versions

Construction

The rain gauge is manufactured entirely from non-corrosive materials. The base and septum ring are cast in Aluminium Alloy LM25, heat treated and protectively coated.

The outer ring and funnel are fabricated from aluminium alloy sheet and again protectively coated.

Stainless steel mesh is employed to protect the inlet and outlet ports from the ingress of foreign bodies.

Preparation for use

Each instrument is delivered ready calibrated to indicate either 0.1 mm, 0.2 mm or 0.5 mm of rainfall each time the bucket tips.

It is also recommended that the rain gauge be installed in a location or enclosed compound away from access by the general public.

Prepare a reasonably level site for the rain gauge paying due regard to the following points:

- No object should be nearer than four times its own height from the bucket.
- Do not locate the rain gauge in a hollow or on top of a hill.
- Tall buildings or belts of trees can cause turbulence and gusts which can increase or decrease the rain collected.
- The surrounding soil should be capable of allowing the discharged water to drain away freely.

Warning !

The septum ring has a sharp edge and should be treated with care whenever handling the instrument.

4.1. Standard Single Output Non-Heated Version

1. Release the two catches securing the outer cover to the base and then carefully lift off the cover.
2. Feed a suitable length of 2 A, 2-core cable, through the grommet.
3. Connect the instrument end of this cable to the terminal block provided on the underside of the base unit for the output signal.
4. Connect the free end to the counting device, see Figure 3 and Chapter 6
5. Go to Section 4.3.

4.2 Standard Dual Output Non-Heated Version

1. Release the two catches securing the outer cover to the base and then carefully lift off the cover.
2. Feed a suitable length of 2 A, 4-core cable, through the grommet.
3. Connect the instrument ends of two of the cores to adjacent terminals connected to the white leads on the block provided on the underside of the base unit for the output signals.
4. Connect the free ends of these cores to the first counting device (see Figure 3 and Chapter 6).
5. Connect the instrument ends of the other two cores to the other adjacent terminals connected to the white leads on the block.
6. Connect the free ends of these cores to the second counting device (see Figure 3 and Chapter 6).
7. Go to Section 4.3.

4.3 General

1. Seal all weather connections using a silicone rubber compound.
2. With the base plate mounted in its correct location on site, adjust the three levelling screws until the built-in spirit level indicates that the unit is level.
3. Once the unit is level secure the locknuts.
4. It is advisable to secure the base unit permanently to a firm foundation using the two holding lugs provided.

These accept either 9.5 mm or 3/8" rawl bolts.

Do not over tighten the fixings.

A restriction, such as an elastic band, may have been fitted to prevent the bucket from moving during transit.

5. Carefully remove any restriction and check that the bucket pivots freely.
6. Replace the outer cover of standard versions, with the catches engaged in the cutouts in the base plate.
7. Replace the outer cover of versions that meet the Environmental Agency Framework Directive, then use the Allen Key to lock the three catches to secure the cover to the base.

The rain gauge is now ready for operation.

5. MAINTENANCE

Warning !

The septum ring has a sharp edge and should be treated with care whenever cleaning or handling the instrument.

Periodically check for debris in the funnel and blockage of the inlet and outlet ports. Remove any debris present and clean the meshes.

The water outlet on the underside of the funnel can be unscrewed allowing the inlet mesh to be removed and cleaned.

If necessary, bucket surfaces can be cleaned using a mild detergent solution.

6. Counting the bucket tips

A variety of devices may be used to count the bucket tips, these include:

- Data Loggers (with contact closure input capability),
- Event counter (a simple LCD counter to indicate bucket tips),
- Chart Recorder,
- Computer data acquisition system.

Consideration should be given to ensure that the counting/logging device used can accept a contact closure input.

For fast counter inputs, some form of capacitor-resistor filtering may be necessary to reduce bounce effects in the contact signal.

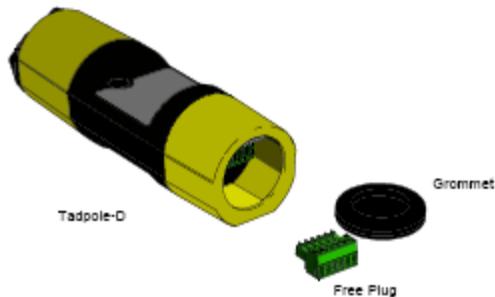
For details of suitable logging devices please contact the Casella sales department.

Please go through these procedures *before you go to site*.

6.1 Harvest software

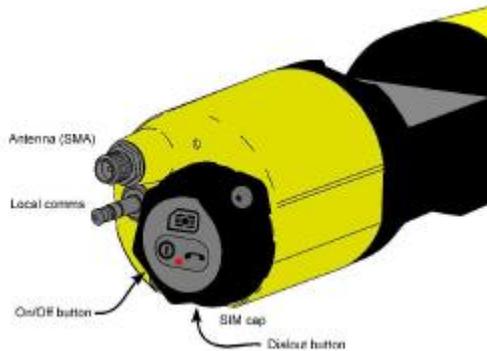
You need to get Harvest software so you can read and configure the F1262. Install this software from the CD supplied with the logger.

6.2 F1262 System components



The parts shown above are included with each LOG 8

The LOG 8 uses requires GSM antenna connected to the SMA connector on the end cap



To read and configure the F1262 locally, you will need one of these communications cables:

CBL-TAD-EXT local serial cable (RS-232)



CBL-TAD-USB local serial cable (USB)



6.3 SIM fitting

Fit a SIM by loosening the two screws securing the SIM cap and draw the cap away.

