

# Tipping Bucket Rain Gauge

User Manual

Catalog Numbers: 82300, 82300-1, 82302, 82302-1



## Description

The sensor consists of a gold anodized aluminum collector funnel with a knife-edge that diverts the water to a tipping bucket mechanism. A magnet is attached to the tipping bucket, which actuates a magnetic switch on each tip of the bucket. The water drains out of the bottom of the housing, so the sensor requires no attention or servicing.

The aluminum housing is finished with a white powder-coat to withstand years of exposure to the environment.

Heating option is available to keep the sensor operational during snow and ice events. The rain gauge will report the snow and ice as rain accumulation.

## Specifications

Resolution: 0.01"

Accuracy: 1.0% up to 2"/hr (50 mm/hr)

Collector Diameter: 6.060" (154 mm) with knife-edge

Splash Out Protection: >2" (50 mm)

Operating Temp: 32 to 158°F (0 to 70°C)

Storage Temp: -40 to 185°F (-40 to 85°C)

Humidity Limits: 0 to 100%

Weight: 4 lbs (1.8 kg)

Height: 10.25" (261 mm)

Bucket: Black ABS injection molded

Level: Integral Bubble Level

## Installation

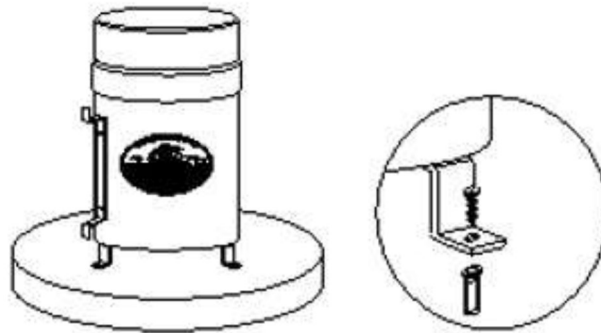
A clear and unobstructed mounting location is necessary to obtain accurate rainfall readings.

This transmitter is designed to be mounted two ways, by surface mounting or mast mounting. Surface mounting is recommended whenever possible. The transmitter housing must be mounted in a level position and in a location, free from vibration. If mast mounted, make sure that the mast is properly guyed so that vibration in high winds is kept to a minimum.

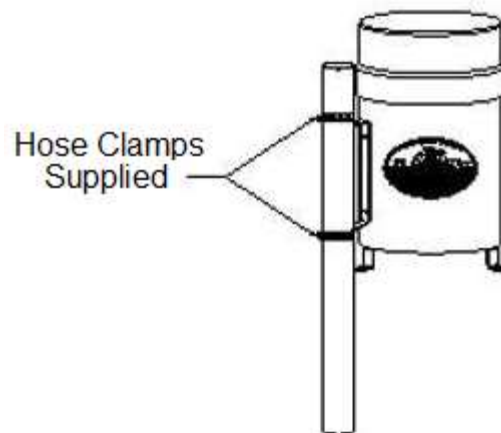
**Important:** After transmitter installation, remove the gold funnel and observe the black tipping bucket. It should not be held in a dead center position by the magnetic attraction of the bucket magnet and the magnetic switch. Press either end of the bucket down against the stop to be sure it is not centered.

The funnel and tipping bucket mechanism should be cleaned periodically. An accumulation of dirt, bugs, etc. on the tipping bucket will adversely affect the calibration.

## Mounting Examples



Surface Mounted



Mast Mounted

## Field Calibration

Absolutely accurate calibration can be obtained only with laboratory equipment, but an approximate field check can be easily made. The tipping bucket mechanism is a simple and highly reliable device. The transmitter must be located in a clear area, away from trees, buildings, etc. It must also be mounted level. Accurate readings will not be obtained unless the transmitter is mounted in a level position. The mechanism must be clean. Any accumulation of foreign material, dust, etc. will alter the calibration of this unit. The transmitter must be calibrated with the rate of flow of water through the tipping bucket mechanism under control. At least 36 seconds should be allowed to fill one side of the tipping bucket. This represents a maximum flow rate of an inch of rain per hour. If the flow rate is increased, then the instrument will read low (if properly calibrated). Decreasing the rate of flow will not materially affect the calibration. The reason for this is obvious if the tipping bucket assembly is observed in operation...with water falling into one side of the tipping bucket, there comes a point when the weight of this water starts to tip the bucket. Some time is required for the bucket to tip (a few milliseconds).

During the first 50% of this tipping time, water continues to flow into the filled bucket; the last 50% of this tipping time, water flows into the empty bucket. The amount of water flowing during the first 50% of the time is error, the faster the flow rate the greater the error. Now at flow rates of one inch per hour (100 bucket fillings) or less, the water actually drips into the bucket rather than flowing. Under this condition, the bucket tips between drips, and no error water is added to a full moving bucket.

### *TO CHECK CALIBRATION:*

A field calibration kit is available from Columbia Weather Systems, and it consists of a holding tank, pre-measured beaker, two orifices, cleaning tools and instructions.

After sensor is mounted in its permanent location and following the local electrical codes for the particular location, connect to 120 VAC. The sensor has two heater, one is attached to the underside of the inner collector funnel and one is attached to the inside lower portion of the sensor housing. These two heater are connected in series with a thermostat that is positioned near the tipping assembly. When the outside temperature drops to approximately 45°F, the thermostat will start to cycle. It will close for a few seconds at this temperature maintaining the inside temperature on the inside housing. As the temperature continues to drop the thermostat will remain on for longer periods of time and by the time the temperature outside is around -35°F, the thermostat will stay closed most of the time. Since electrical codes are different from location to location it is impossible to provide the necessary materials such as conduit, wire and accessories so we have provided a service box attached to the outside of the sensor which has conduit fitting knock-outs on all four sides. A cable gland has been included if codes allow cabling to be run without conduit, also three wire nuts have been provided.

### **Heater Specifications**

Collector Heater	65 Watts
Housing Heater	116 Watts
Collector Heater	41.3 Volts AC
Housing Heater	73.7 Volts AC
Collector Heater	26.2 Ohms
Housing Heater	46.8 Ohms

**Total Amperage when both heater are wired in series: 1.65 Amps Max.**

### **Connections:**

Green	Case Ground
White	Neutral
Black	120 VAC



**Be Sure to remove Debris screen from top of collector during snow or icing conditions.**