Rain Gauge Smart Sensor (Part # RGA-M0XX, RGB-M0XX)

The Rain Gauge smart sensor is designed to work with the HOBO Weather Station logger. The smart sensor has a plug-in modular connector that allows it to be added easily to a HOBO® Weather Station. All sensor parameters are stored inside the smart sensor, which automatically communicates configuration information to the logger without the need for any programming or extensive user setup.

Specifications	Rain Gauge Smart Sensor
Measurement Range	0 to 12.7 cm (0 to 5 in.) per hour, maximum 4000 tips per logging interval
Calibration Accuracy	±1.0% at up to 20 mm/hour (1 in./hour)
Resolution	0.01 in. (S-RGA-M0XX) or 0.2 mm (S-RGB-M0XX)
Calibration	Requires annual calibration: can be field calibrated or returned to the factory for re-calibration
Operating Temperature Range	0° to +50°C (+32° to +122°F), survival -40° to +75°C (-40° to +167°F)
Environmental Rating	Weatherproof
Housing	15.24 (6-inch) aluminum bucket
Mechanism	Tipping bucket; stainless steel shaft with brass bearings
Dimensions	22.8 cm height x 15.4 cm diameter (9 x 6 in.), 15.4 cm (6.06 in.) receiving orifice
Weight	1 Kg (2 lbs)
Bits per Sample	12
Number of Data Channels *	1
Data Format	Number of tips per recorded measurement, reported in inches or millimeters
Measurement Averaging	No
Cable Lengths Available	2 m (6.5 ft) S-RGA-M002, RGB-M002 6 m (19.7 ft) S-RGA-M006, RGB-M006
Length of Smart Sensor Network Cable *	2 m (6.5 ft) S-RGA-M002, RGB-M002 6 m (19.7 ft) S-RGA-M006, RGB-M006
Part Numbers	S-RGA-M002 (0.01 in. per tip with 2 m cable) S-RGA-M006 (0.01 in. per tip with 6 m cable) S-RGB-M002 (0.2 mm per tip with 2 m cable) S-RGB-M006 (0.2 mm per tip with 6 m cable)
CE Specification	This product meets CE specification EN61326 criterion A for ESD, criterion B for Radiated Immunity, criterion B for Fast Transient, criterion A for Conducted Immunity, and criterion B for Radiated Emissions Group 1. To minimize measurement errors due to ambient RF, use the shortest possible probe cable length and keep the probe cable as far as possible from other cables.

* A single HOBO Weather Station can accommodate 15 data channels and up to 100 m (328 ft) of smart sensor cable (the digital communications portion of the sensor cables).

Part #: MAN-S-RGX
Doc #: 6036-E

Inside this Package

- Rain Gauge Smart Sensor
- Mounting Accessories: 2 hose clamps, 3 screws

Mounting

NOTICE: During shipment the tipping assembly has been secured to avoid possible damage to the pivot assembly. Lift off the collector ring assembly (ring, screen, and funnel), and remove the rubber band from inside to release the tipping-bucket mechanism before installation.

Accessories

- One Meter Mast (Part # M-MPA)
- Guy Wire Kit (Part # M-GWA)
- Mast Level (Part # M-LVA)

Pole or Tripod Mounting

If mounting the Rain Gauge smart sensor on a pole or tripod:

- Use hose clamps to mount on pole or tripod (see Figure 1 below)
- Verify that the pole is vertical using the mast level
- Ensure that the top of the mast is below the top of the Rain Gauge
- Use guy wire kit if using a tall pole or tripod in a windy location

Horizontal Surface Mounting

If mounting the Rain Gauge on a horizontal surface:

- The Rain Gauge housing MUST be mounted in a LEVEL position, clear of overhead structures, and in a location free from vibration
- Place the bucket on the mounting surface and mark the holes for the three mounting screws
- For wood surfaces, drill three $1/16^{th}$ inch holes
- For concrete, drill three appropriately sized holes with a masonry bit, and install screw plug inserts
- Use shims as required to level the bucket
- Fasten the bucket with the screws shipped with the Rain Gauge

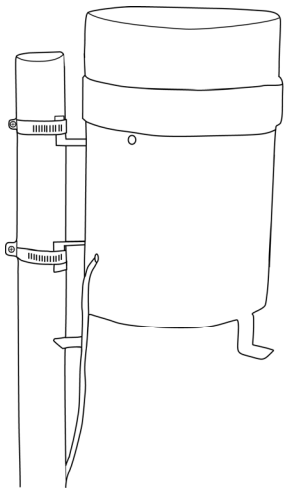

Figure 1: Pole or Tripod Mount

Mounting Considerations

- Tall objects can interfere with accurate rain measurements. It is recommended that you place the rain bucket away from the obstruction by a distance greater than three times the height of the obstruction. If that is not possible, raise the rain bucket as high as possible to avoid shedding.
- Avoid splashing and puddles. Be sure the gauge is high enough above any surface that rain will not splash into the top of the collector.
- Vibration can significantly degrade accuracy of the tipping bucket mechanism. In windy locations make sure that the bucket will be vibration-free. Consider using guy wires to secure a pole or tower-mounted bucket.
- Refer to the *HOBO Weather Station User's Guide* for more information regarding setting up complete HOBO Weather Stations.

Connecting

To start using the Rain Gauge smart sensor, stop the logger and insert the modular jack into an available port. If a port is not available, use a 1-to-2 adaptor (Part # S-ADAPT), which allows you to plug two sensors into one port. The next time you use the HOBO Weather Station, it will automatically detect the new sensor. Note that the HOBO Weather Station supports a maximum of 15 data channels; this sensor uses one data channel. Launch the logger and verify that the sensor is functioning correctly. See the *HOBO Weather Station User's Guide* for more details about connecting smart sensors to the HOBO Weather Station.

Operation

The Rain Gauge smart sensor measures rainfall by counting the number of tips per recorded measurement. The Rain Gauge smart sensor counts up to 4000 tips per logging interval (40 inches or 80 cm of rain).

Maintenance

Clean the filter screen, funnel, and tipping-bucket mechanism with mild soap and water and a cotton swab. An accumulation of dirt, bugs, etc. on the tipping bucket will adversely affect the calibration. Oil the needle bearings with light oil on an annual basis. In harsh environments, it is recommended that you lubricate the needle bearings more frequently.

Field Calibration

The tipping-bucket mechanism is a simple and highly reliable device. Absolutely accurate Rain Gauge smart sensor calibration can be obtained only with laboratory equipment, but an approximate field check can be easily done. The Rain Gauge smart sensor must be calibrated with a controlled rate of flow of water through the tipping-bucket mechanism.

The maximum rainfall rate that the Rain Gauge smart sensor can accurately measure is one inch of rain per hour (36 seconds between bucket tips). Therefore, the Rain Gauge smart sensor should be field calibrated using a water flow rate equivalent to, or less than, one inch of rain per hour (more than 36 seconds between bucket tips).

To Check Calibration

1. Obtain a plastic or metal container of at least one liter capacity. Make a very small hole (a pinhole) in the bottom of the container.
2. Place the container in the top funnel of the Rain Gauge Smart Sensor. The pinhole should be positioned so that the water does not drip directly down the funnel orifice.
3. Follow the instructions for the Rain Gauge model you have.

   S-RGA-M00X: Pour exactly 473 ml of water into the container. Each tip of the bucket represents 0.01 inch of rainfall.

   S-RGB-M00X: Pour exactly 373 ml of water into the container. Each tip of the bucket represents 0.2 mm of rainfall.
4. If the test takes less than one hour for this water to run ou, then the hole (step 1) is too large. Repeat the test with a smaller hole.
5. Successful field calibration of this sort should result in one hundred tips plus or minus two.
6. Adjusting screws are located on the outside bottom of the Rain Gauge housing. These two socket head set screws require a 5/64 inch Allen wrench. Turning the screws clockwise increases the number of tips per measured amount of water. Turning the screws counterclockwise decreases the number of tips per measured amount of water. A ¼ turn on both screws either clockwise or counterclockwise increases or decreases the number of tips by approximately one tip. Adjust both screws equally; if you turn one a half turn, then turn the other a half turn.
7. Repeat Steps 3–6 as necessary until the sensor has been successfully calibrated.

Warranty

As part of Onset's ongoing efforts to provide 100% customer satisfaction, our Continuing Engineering Group constantly monitors and evaluates all of our products and software. In the unlikely event any significant defect is found, Onset will notify you. If you find a defect, please e-mail us at loggerhelp@onsetcomp.com.

Onset Computer Corporation (Onset) warrants to the original end-user purchaser for a period of **one year** from the date of original purchase that the HOBO® product(s) purchased will be free from defect in material and workmanship. During the warranty period Onset will, at its option, either repair or replace products that prove to be defective in material or workmanship. This warranty shall terminate and be of no further effect at the time the product is (1) damaged by extraneous cause such as fire, water, lightning, etc. or not maintained in accordance with the accompanying documentation; (2) modified; (3) improperly installed; (4) repaired by someone other than Onset; or (5) used in a manner or purpose for which the product was not intended.

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Returns

Please direct all warranty claims and repair requests to place of purchase.

Before returning a failed unit directly to Onset, you must obtain a Return Merchandise Authorization (RMA) number from Onset. You must provide proof that you purchased the Onset product(s) directly from Onset (purchase order number or Onset invoice number). Onset will issue an RMA number that is valid for 30 days. You must ship the product(s), properly packaged against further damage, to Onset (at your expense) with the RMA number marked clearly on the outside of the package. Onset 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. Loggers and sensors must be clean before they are sent back to Onset or they may be returned to you.

Repair Policy

Products that are returned after the warranty period or are damaged by the customer as specified in the warranty provisions can be returned to Onset with a valid RMA number for evaluation.

ASAP Repair Policy

For an additional charge, Onset will expedite the repair of a returned product.

Tune Up Service

Onset will examine and retest any HOBO data logger or sensor.

CE The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).

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