



Driving Rain Gauge Datasheet

Rain detection sensor

General Description

Driving rain and its effective management are critical factors in determining the durability of building enclosures. An accurate measurement of driving rain can be important for risk assessment purposes and in research (where it may be necessary to establish boundary conditions).

The driving rain gauge is used to measure the amount of rain falling on the side of a building. It has a unique tipping bucket rain gauge that is effective and long-lasting, with aluminum construction and initial readings as low as 0.05mm of driving rain. Each rain gauge is approximately 12" wide x 17" high x 2.5" deep (30 x 43 x 6 cm) and comes with a standard 12m cable.

These gauges must be connected to an A2 Pulse Counter unit. SMT also offers an optional Solar Radiation sensor and External Relative Humidity and Temperature sensors.

Applications

- Assess potential risks due to rain
- Research (may be necessary to establish boundary conditions)
- Monitoring wind driven rain effects

Features

- Records wind driven rain over 12" x 17" x 2.5" (30 x 43 x 6 cm)
- UV resistant
- Stainless steel construction
- Rugged design
- Optional RH, temperature, and solar radiation sensors
- Comes with standard 12m cable

Ordering Information

Rain Gauge with A2 Pulse	RG-01
Rain Gauge with A2 Pulse and RH/T	RG-01-R
Rain Gauge with A2 Pulse and Solar Radiation	RG-01-S
Rain Gauge with A2 Pulse, RH/T and Solar Radiation	RG-01-RS



An example of a configuration for the Driving Rain Gauge (non-deployed). Has 1 of the 3 optional sensors available.

A2 Pulse Counter Specifications

Electrical Performance

Wireless

Specification	IEEE 802.15.4
Working Frequency	2.4 GHz – 2.4835 GHz
Power	20dBm (100mW)
Output Range (free air)	1000m. Powered repeaters can be added to extend range.
Max Nodes per coordinator	32 (dependent on application density and acquisition speed)

Battery

Life	1 year (hourly sampling) External battery packs available for 3 year sampling.
Type	2 AAA Ni-MH Rechargeable Eneloop HR-4UTGA
Max Voltage	3V
Capacity	Typical: 1600 mAh Minimum 1500 mAh
Self Discharge	75% after 3 years
Charging Cycles	Up to 1500
Charger	USB 5V

Memory and USB

Memory	16 Mbit EEPROM for data storage Stores 340,000 data points.
USB	USB 1.0 Interface

Environmental

Operating Temperature	0° to 40°C / 32° to 104°F
Storage Temperature	-25° to 70°C / -13° to 158°F
Humidity	5% to 100% RH non-condensing
Electrostatic Discharge (ESD)	8kVdc air, 4 kVDC contact (exposed inputs)

Safety/Regulatory

Safety Requirements SELV Separated Extra Low Voltage

Regulatory Contains FCC ID: OA3MRF24J40MA



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

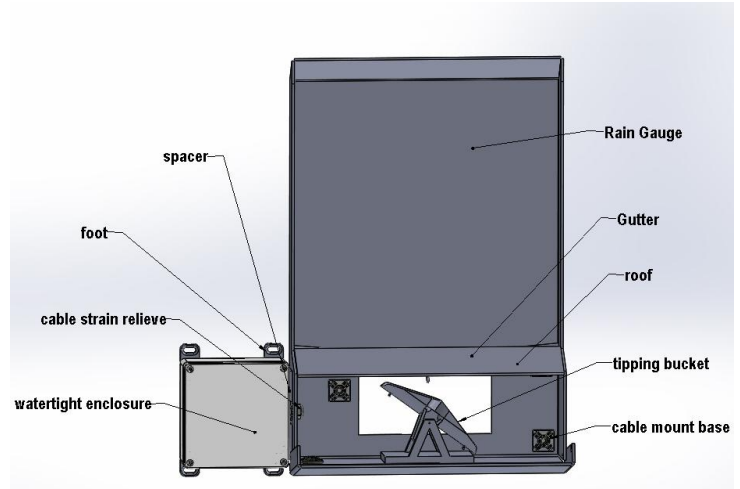
Contains IC: 7693A-24J40MB

Rain Gauge Specifications

Mechanical

Dimensions	12" wide x 17" high x 2.5" deep (30 x 43 x 6 cm)
Weight	
Composition	Aluminum

Specifications are subject to change without notice



Labelled diagram of a Driving Rain Gauge

Installation

Preparation

1. Avoid locations where trees or plantings could potentially drop leaves, debris, etc. causing the drain system to be blocked.
2. Use signage or other acceptable methods when the Driving Rain Gauge is used near grade, balconies, or windows so that objects are not deposited into the gauge, causing readings to be inaccurate

Procedure

There are 3 fastening locations provided on the Driving Rain Gauge.



Rain Gauge with cover closed and open. When open, 3 fastening locations are available



Close-up of opened cover and right side thumb-screw.

1. The top centre location should be attached first, but not fully tightened
2. The unit can be levelled using a level and the 2nd and 3rd fasteners installed through the tipping bucket area of the gauge. It is accessed by loosening the thumb-screw on the lower right side of the unit and folding open the cover.
3. The top fastener can then be fully tightened. *(The wiring for the unit can be run out of the back of the unit straight through the wall or down the exterior of the wall.)*

Programming

1. The SMT A2 Pulse Datalogger is used to monitor tipping bucket transitions.
2. The A2 will report accumulated pulses in the interval set by the Building Intelligence Gateway (BiG). Typical sample time is 1 hour.
3. Each switch closure of the standard Driving Rain Gauge is signalled by a measurement of 5.44cm^3 (0.33in^3) of water from a given 929cm^2 (144in^2) catchment area which corresponds to 0.059mm (0.002in) of driving rain on the vertical wall surface.

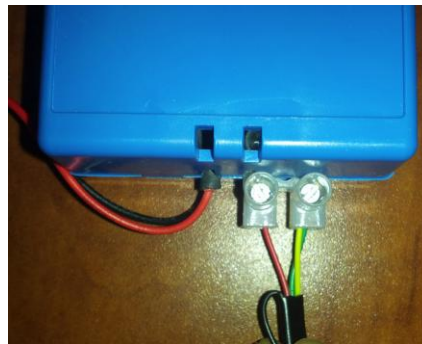
A2's set to read pulse counts are equipped in an outdoor enclosure. Connect the NEMA enclosure to the Driving Rain Gauge as shown below.



Cut the supplied RJ11 wire as required and connect to the A2 as shown below. (This image is looking at the top of the A2 unit.)

Polarity is not important. The yellow and green wires are **connected together**.

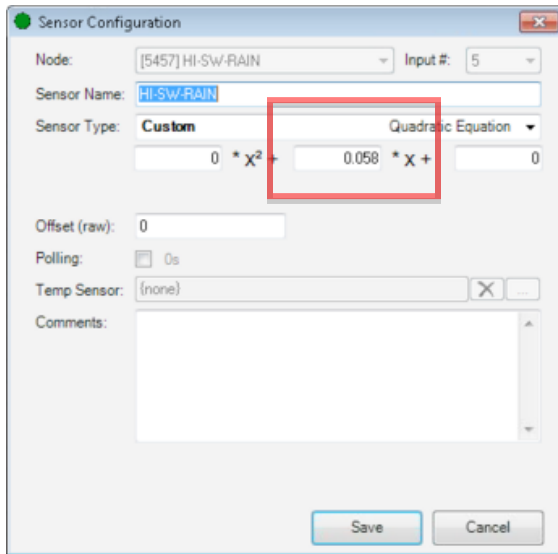
The Menu button on the A2 is not present. To take a reading, press the Select button once to wake up the screen and another time to select measure. The unit will automatically join the network when connected.



Maintenance

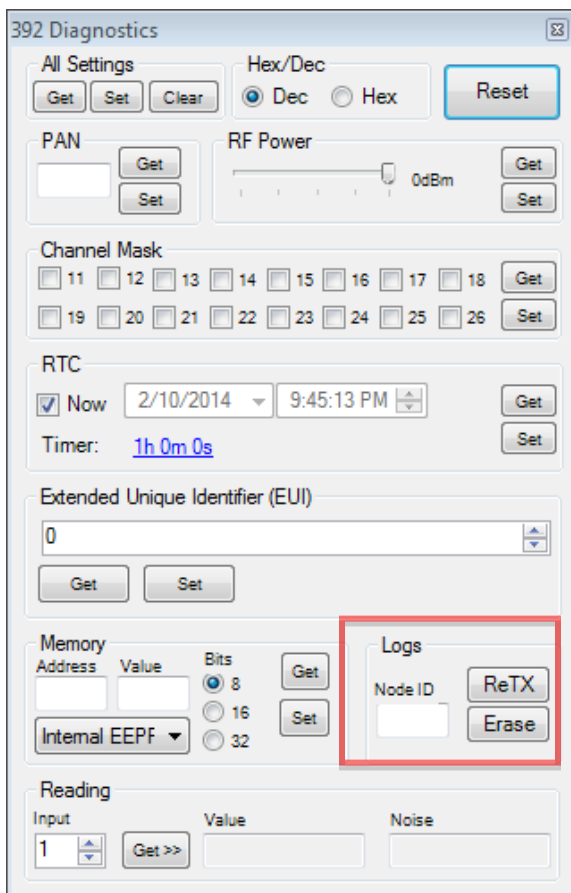
1. Cleaning and verification is required only at the time of installation and annually thereafter. If the gauge is installed in an area with known airborne debris, it is suggested to monitor it and determine an appropriate maintenance schedule.
2. To verify performance, slowly pour approximately 50mL (1.7oz) of water into the Driving Rain Gauge and simultaneously monitor the number of switch closures recorded by the A2 Pulse Counter unit. If the proper number is not recorded, the test should be repeated. After 2 incorrect results, the logging system and wiring should be investigated for continuity and to make sure the system is reading at the correct frequency to record the switch closure signal.

Pulse Counter Configuration in BiG



Select the A2 and right click on sensor input 5 and select Configure. Under the sensor type *Custom* select *Quadratic Equation*. Enter 0.058 for the x value as shown below.

Each tip contains 5.44mL. On a 12"x12" surface area (144in² = 929cm²) that would be 0.058 mm of rainfall onto the vertical surface of the rain gauge.



As noted, the Menu key on Pulse units is not present as the pulse counting was routed to the internal interrupt port previously used by the switch.

In order to clear the log of a pulse unit the following actions will need to be performed:

- Enable the superuser menu in BiG.
 - Select the directory where the BiG database is stored.
 - Windows Vista/7/8 -> C:\ProgramData\BiG\
 - Create a file called superuser with no extension. You may need to select "Hide Known File Types" in Folder Options
- Under Devices double click on the I3.
- Enter the NodeID of the A2 into the box under Logs that you wish to zero.
- Select Erase. WARNING: No confirmation is shown when this is selected.
- Once the A2 responds (within 5 minutes or immediately if measure selected) the Log will be erased.