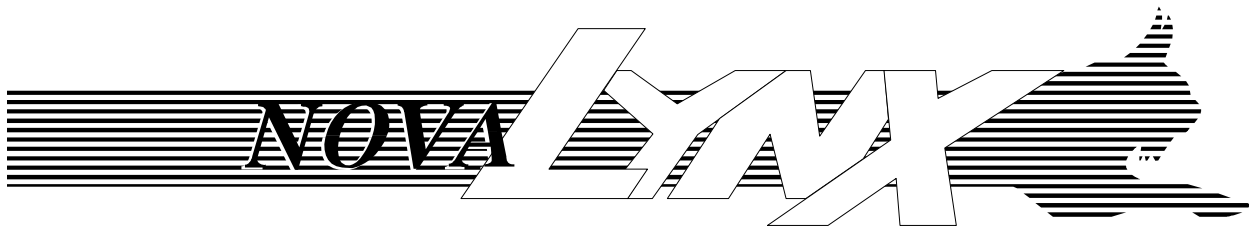


NOVALYNX CORPORATION

MODEL 110-WS-16RC
TIPPING BUCKET RAIN GAUGE

INSTRUCTION MANUAL



REVISION DATE: NOV 2005

Receiving and Unpacking

Carefully unpack all components and compare to the packing list. Notify NovaLynx Corporation immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. Damages to equipment sent via Parcel Post or UPS require the consignee to contact NovaLynx Corporation for instructions.

Returns

If equipment is to be returned to the factory for any reason, call NovaLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage or additional damage during the return shipment. Call NovaLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with the packaging. Please write the RA# on the outside of the box.

Warranty

NovaLynx Corporation warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. NovaLynx Corporation's obligations under this warranty are limited to, at NovaLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall NovaLynx Corporation's liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by NovaLynx Corporation, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

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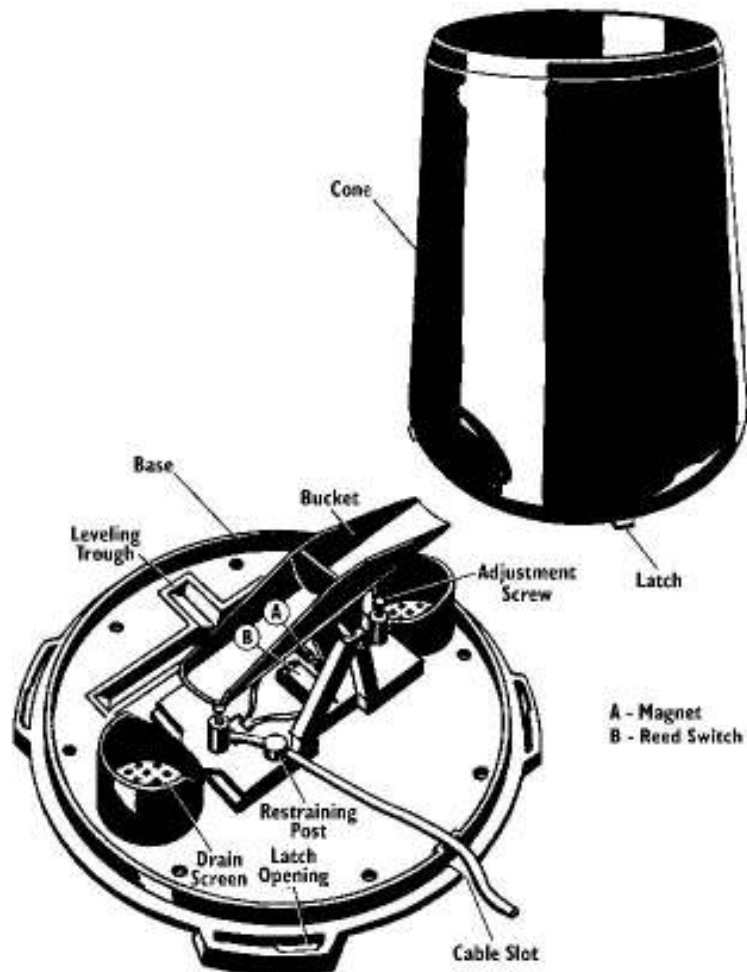
MODEL 110-WS-16RC EQUIPMENT CONFIGURATION AND IDENTIFICATION

The 110-WS-16RC Rain Gauge includes the following components. Please make sure you have all listed components before continuing.

- Rain Gauge with Cable - The rain gauge comes with the cone attached to the base. The standard version of the rain gauge comes with a 40' (12m) cable.
- Debris Screen - This screen is placed into the rain gauge cone to help prevent debris from clogging the funnel hole. In addition, it aids in directing the flow of water into the tipping bucket at high rates of rainfall.
- Mounting Arm - The mounting arm provides easy mounting of the gauge to the tripod mast using a 1-3/4" u-bolt.



This illustration below shows the internal components of the rain gauge, many of which are referenced in this manual.



NovaLynx Corporation

Model 110-WS-16RC Tipping Bucket Rain Gauge Instruction Manual

1.0 INTRODUCTION

The 110-WS-16RC Rain Gauge is a tipping bucket rain gauge designed to meet the guidelines of the World Meteorological Organization. Rain enters the collector cone, passes through a debris-filtering screen, and collects in one chamber of the tipping bucket. The bucket tips when it has collected an amount of water equal to 0.01" (0.254 mm) of rainfall. As the bucket tips, it causes a switch closure and brings the second tipping bucket chamber into position. The rain water drains out through the screened drains in the base of the collector.

The body and base of the collector are constructed of tough, UV resistant plastic. The tipping bucket pivots on bearings that minimize friction and wear. Stainless steel adjustment screws under each chamber of the tipping bucket allow you to fine-tune the calibration. Mounting holes are pre-drilled in the base and a built-in leveling trough aids in installation.

2.0 TESTING THE RAIN GAUGE

Before installing the rain gauge:

1. Turn the rain gauge upside down and remove the cone from the base by rotating the base until the latches on the cone line up with the latch opening in the base then lifting the base away from the cone.
2. Remove the foam or rubber band which holds the bucket in place during shipping.
3. Attach the two leads of the rain gauge cable to the appropriate connectors on the data acquisition module: red wire to P3, black wire to GND.
4. While watching the WS-16 observation display, tip the bucket until it drops to the opposite side. If the rainfall amount displayed on the console increases by the expected increment (usually 0.01" or 0.254 mm) each time you tip the bucket, your rain gauge is working properly.



3.0 INSTALLATION

3.1 Choose a Location

The location of the rain gauge is very important to the successful operation of the instrument. The most accurate measurements are made in relatively sheltered areas protected from gusting and turbulent winds. Openings in orchards or a grove of trees offer the best exposure for the rain gauge. Fences and other structures can help serve as a wind break as long as they are not too tall.

Generally, the heights of objects near a rain gauge should be proportional to the distance away from the gauge. The distance of a nearby object should be at least twice the height of the object above the gauge.

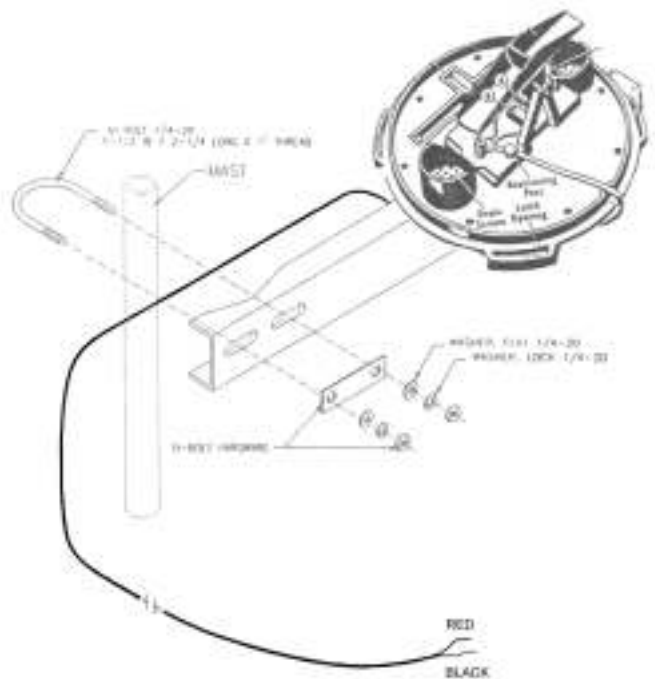
Keep the following in mind when choosing a location for your rain gauge.

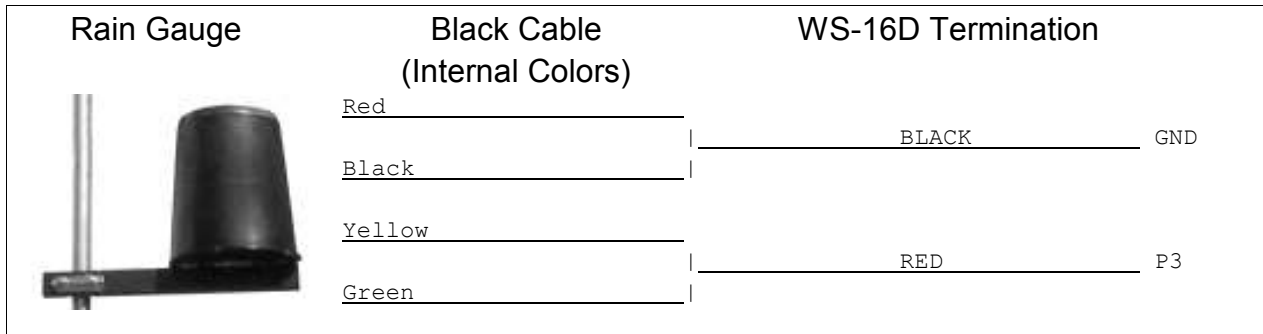
The rain gauge must be level. Verify using a bubble level or by pouring water into the T-shaped leveling trough in the base of the gauge.

Choose a location which is easily accessible for normal cleaning and is distant from trees or other sources of heavy pollen or debris.

3.2 Install the Rain Gauge

1. Separate the cone from the base.
2. If necessary, disconnect the rain gauge cable from the data acquisition module.
3. A mounting arm is supplied with the rain gauge. Mount onto the vertical mast of the tripod supplied with the station, using the attached u-bolt.
4. Attach the two leads of the rain gauge cable to the appropriate connectors on the data acquisition module: red wire to P3, black wire to GND. Note: The 4-conductor cable supplied with the gauge has been converted to a 2 wire connection marked with red and black shrink sleeving. (See diagram below.)

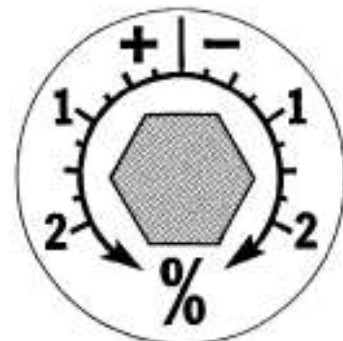




- To be certain the rain gauge is functioning properly after installation, re-test the unit as described in "Testing the Rain Gauge" above.
- Once you are sure the unit is functioning properly, place the cone back onto the base by putting the latches on the cone into the latch openings in the base and rotating the cone clockwise until the latches "lock" into place.
- Place the debris screen, points down, into the cone. The screen prevents large bits of debris from blocking the funnel hole.
- To prevent fraying or cutting of the cable where it is exposed to weather, it is important that you secure it so it doesn't whip about in the wind. Use cable clips or weather resistant cable ties to secure the cable. Place clips or ties approximately every 3 to 5 feet (1 to 1.6 m). Do not use metal staples or a staple gun to secure cable. Metal staples, especially when installed with a staple gun, tend to cut the cable.
- If the cable length supplied with the rain gauge is not long enough for your purpose, you may extend it. The maximum length of cable is 900 feet (270 m).

4.0 CALIBRATION

The rain gauge is calibrated at the factory so the bucket tips for each 0.01" (or 0.254 mm) of rainfall. To adjust the calibration slightly, use a 3/16" (5 mm) wrench to rotate the adjustment screws which are located underneath the bucket. The adjustment guide embossed in the platform shows how far you must rotate both screws in turn to effect a 1% and a 2% change.



The funnel size is 6.5" in diameter, therefore
0.01" of rainfall = 5.44 ml of water.

Moving the screws in the positive (+) direction causes the bucket to tip more times (i.e. give a larger count) for a given amount of water.

544 ml of water poured into the rain gauge *very slowly would be equal to 1.00 inch of rainfall or 100 tips.

* Very slowly means at least 30 minutes for this amount of water, poured into the gauge at a near constant rate.

5.0 MAINTENANCE

For greatest accuracy, you should thoroughly clean the rain gauge at least once or twice a year.

1. Disconnect the rain gauge cable from the data acquisition module.
2. Separate the cone from the base.
3. Use warm soapy water and a soft cloth to clean pollen, dirt, and other debris from the cone, cone screen, and bracket.
4. Use a pipe cleaner to clear the funnel hole in the cone and the drain screens in the base.
5. When all parts are clean, rinse with clear water.
6. Reattach the cone and replace the screen.
7. Reconnect the rain gauge cable to the data acquisition module.

6.0 TROUBLESHOOTING

Before calling technical support, carefully check the following troubleshooting guide. You may be able to solve the problem yourself.

6.1 Rainfall is not registering on the display or has a large error

- Check the cable connections from the sensor to the module. Cable connections account for a large portion of the potential problems. Connections should be firmly seated in the terminal strip and plugged in straight. If you think a connection may be faulty, try jiggling the cable while looking at the display. If a reading appears intermittently on the display as you jiggle the cable, the connection is faulty.
- Make sure there is no magnetic, steel, or iron object near the rain gauge.
- Make sure the funnel hole in the cone is clear so water can empty into the bucket.

- Make sure the bucket moves freely when tipping to both sides. The display should show an increase in rainfall for each tip of the bucket.
- Check signal with an ohmmeter. A momentary switch closure should be observed each time the bucket tips.

6.2 Rainfall amount shown on the display has a small error

- Make sure the rain gauge is mounted on a level surface. Use the adjustment screws to adjust the rain gauge's sensitivity, if necessary.