TallTower Grounding

Introduction

Meteorological sensors, loggers, and towers accumulate static electrical charge unless they are properly grounded. High winds, low humidity, and the height of the tower above ground increase the rate of charge accumulation. Charge continues to accumulate until the developed voltage difference - sometimes thousands of volts relative to ground - causes dielectric breakdown and an electrostatic discharge (ESD). ESD will damage any scientific instrument or sensor, including RNRG loggers, RNRG 40C anemometers, or RNRG 200P wind vanes. By attaching an RNRG logger or other instrument to a properly grounded TallTower™ and sensors to the logger, the logger and sensors are also electrically grounded.

Properly grounding your system helps protect your sensors, your wind measurement instruments, and your wind data!

It is your responsibility to provide proper earth grounding for the tower, logger, and sensors. All warranties on RNRG instruments and sensors are voided if your system is not properly grounded.

For many sites, the RNRG grounding kit provides all the needed parts to earth ground your TallTower™ and instrumentation. The grounding kit includes a copper-clad lightning spike and two copper-clad ground rods. Determine the soil type and classify its resistivity: the lower the resistivity, the better the earth ground.

Soil Type	Average Soil Resistivity per cm (Ohms-cm)
1. ashes, cinders, brine, waste	2370
2. Clay, shale, gumbo, loam	4060
3. Same, with varying proportions of sand and gravel	15800
4. Gravel, sand, stones with little clay or loam	94000

The RNRG grounding kit will perform adequately in type 1 and 2 soils. For other soil types, or for sites with a high incidence of lightning, you will need to augment the earth grounding system. Consult RNRG for more information.

Installation

The grounding kit is usually installed before the sensors and sensor cabling in a new installation, but may also be retro-fitted to an existing tower installation. Refer to the drawing on the next page. To install the grounding kit:

1. Drive the two ground rods through the holes provided in the TallTower™ baseplate when laying out the tower. Leave enough of each rod above the baseplate to attach the ground wires.
2. Raise the TallTower™ slightly off the ground. Mount the lightning spike to the tower using the two supplied stainless steel band clamps. If your tower is painted, you will need to prepare the surface of the top tower tube by removing the orange paint directly beneath the lightning spike. Use a grinder or other suitable device to remove the paint from the tube to ensure the lightning spike will be in direct contact with bare metal (see Picture 32). Once the paint is removed, apply a liberal layer of rust-prevention coating (such as Sanchem, Inc. NO-OX-ID "A-SPECIAL") to ensure a long-term bond between the lightning rod and metal tube.
3. For best protection, mount all sensors below a 45° cone from the lightning spike, as shown in the drawing on the next page. Sensors on top-mount or Z booms may be at the top of the tower. For sensors on side-mount booms, keep the boom at least 0.6 m (2 feet) below the top of the tower.

4. Ground your RNRG logger by connecting the logger grounding cable supplied with the logger from the ground stud or terminal on the logger to one of the ground rods. Ground the logger immediately after mounting it to the TallTower™ and prior to connecting the sensors to the logger.