Grounding RNRG Loggers

Introduction

Whenever coming in contact with the SymphoniePLUS3 logger, either in the field or indoors, it is good practice to first grasp a piece of grounded (earthed) metal to avoid a potentially damaging electrostatic discharge (ESD) to the logger.

Meteorological sensors, loggers, and towers will accumulate static charge unless they are properly grounded. Both high wind speeds and low humidity increase the rate of charge accumulation. Static charge can change the electric potential of the logger and sensors by thousands of volts relative to ground. Charge will continue to accumulate until the developed voltage difference causes dielectric breakdown and static discharge.

Electrostatic discharge will damage any scientific instrument, including an RNRG logger. It is very important that you ground your logger immediately after mounting and prior to connecting a sensor. If a copper clad ground rod cannot be driven into the ground at the base of the tower, a long ground rod or grounding cable should be buried in the ground for sufficient distance to reduce the resistance between the logger ground stud and the earth. Failure to adequately ground an RNRG logger will cause damage to the logger, sensor damage, and loss of data. Grounding requirements are site specific; determine soil type before installation.

Site Grounding Recommendations

For many sites, the Renewable NRG Systems Grounding Kit provides all the needed parts to earth ground your tower and instrumentation. The standard Grounding Kit includes a copper-clad lightning spike, copper ground wire, and two copper-clad ground rods. It is recommended that you determine the soil type of your site and classify its resistivity. The lower the resistivity, the better the earth ground is.

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

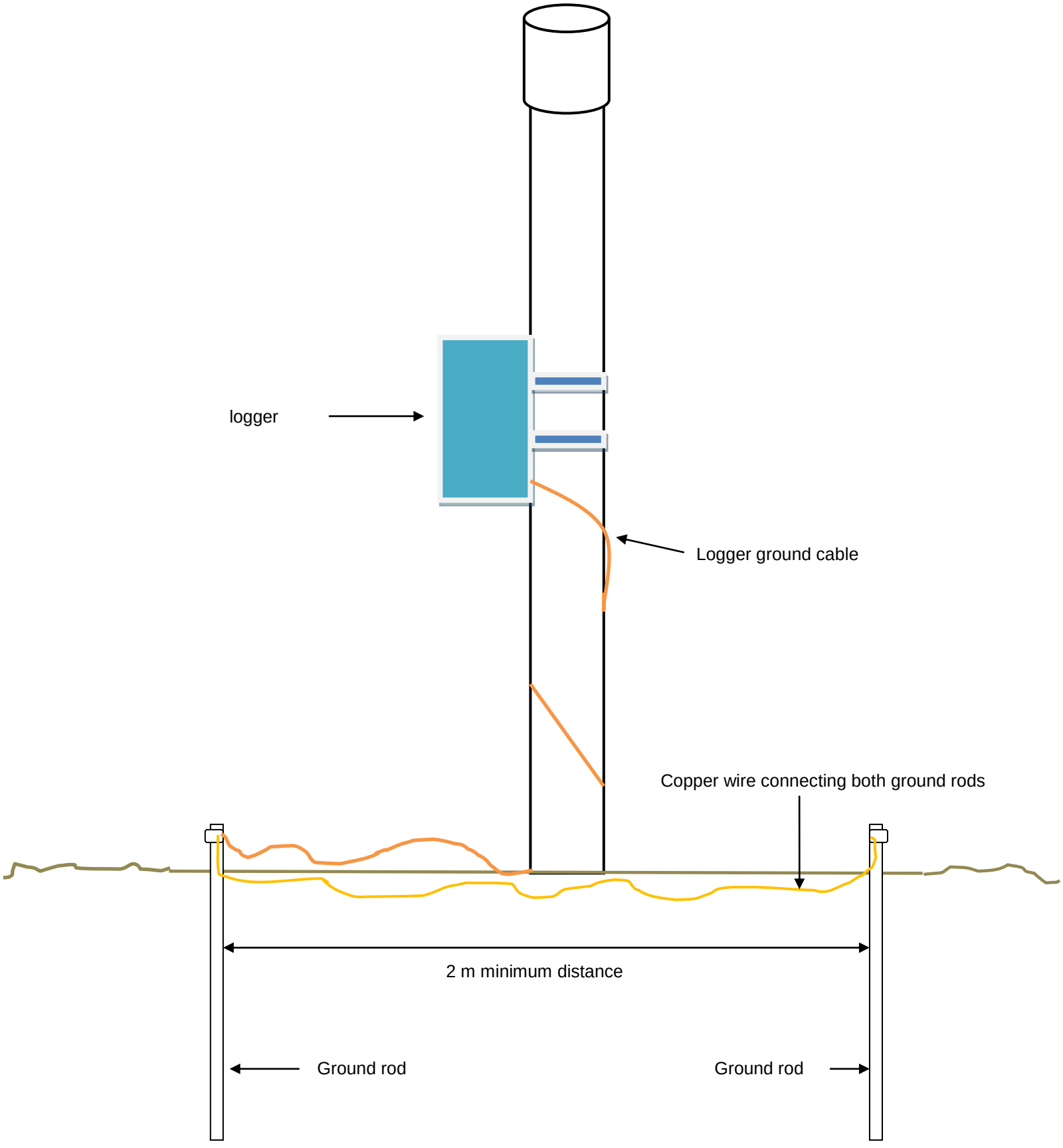
The Renewable NRG Systems Grounding Kit will perform adequately in type 1 and 2 soils. For other soil types, or for sites with a high incidence of lightning, you will need to augment the earth grounding system.

The best approach to grounding will depend on the soil type in your area. Soil resistivity is directly related to moisture content AND temperature. The colder it gets, the higher the resistivity will be for the specific moisture content. Any moisture content below 20% quickly increases ground resistivity exponentially to dangerous levels. In most climates, moisture content and soil temperature change seasonally. During times of the year when the soil is very dry or very cold, soil resistivity is at its highest, and getting a good ground is more difficult. Keep this in mind when evaluating your site - it's better to put in too much grounding than not enough.

You may want to consult a local electric utility regarding grounding techniques they've successfully used in the site area.

Field Installation

- Affix a 5/8 acorn clamp to each of the ground rods. Clamp one end of the bare copper wire to the acorn clamp and the other end to the other ground rod as shown below.
- Cut the logger's ground wire to the required length; do not roll or coil any excess length of ground wire.
- Use high compression fittings at all conductor/rod connections.
- Ensure that the grounding rod(s) is free from non-conducting coatings such as paint or enamel.
- Wire all grounding rods together to provide electrical continuity.
- Protect the above-soil end of the rod and its electrical conductor attachment against damage. Where the soil can become frozen, drive grounding rods below the frost line.
- Apply an anti-oxidation agent to all grounding connections.
- Use longer ground rods, and/or install additional rods to reduce soil resistivity.
- Additional contact surface helps, and soil conductivity improves with depth. If multiple rods are used, they must be installed far enough away from each other [at least 2 meters (6 feet)] so that each rod's effective resistance area does not overlap.
- Where rock is encountered, drive the ground rod at a 45 degree angle, or bury it in a trench at least 0.6 m (2 feet) deep (deeper is better; the key is to maximize the soil contact area).


logger
Logger ground cable
Copper wire connecting both ground rods
2 m minimum distance
Ground rod
Ground rod