Appendix A: Antenna Kits

Antenna factors for the best advantage and antenna kits:

The antenna is the main communication link. The range between the TD200 and the TWIGs depends upon good antennas. An antenna's power gain is a key value that describes the antenna's efficiency. As a transmitting antenna, the value describes how well the antenna converts input power into radio waves. As a receiving antenna, the value describes how well the antenna converts radio waves arriving from a specified direction into electrical power. Antenna gain is usually expressed in decibels, and these units are referred to as "decibels-isotropic" (dBi). For a given frequency, the antenna's effective area is proportional to the power gain. Due to reciprocity, the gain of any antenna when receiving is equal to its gain when transmitting.

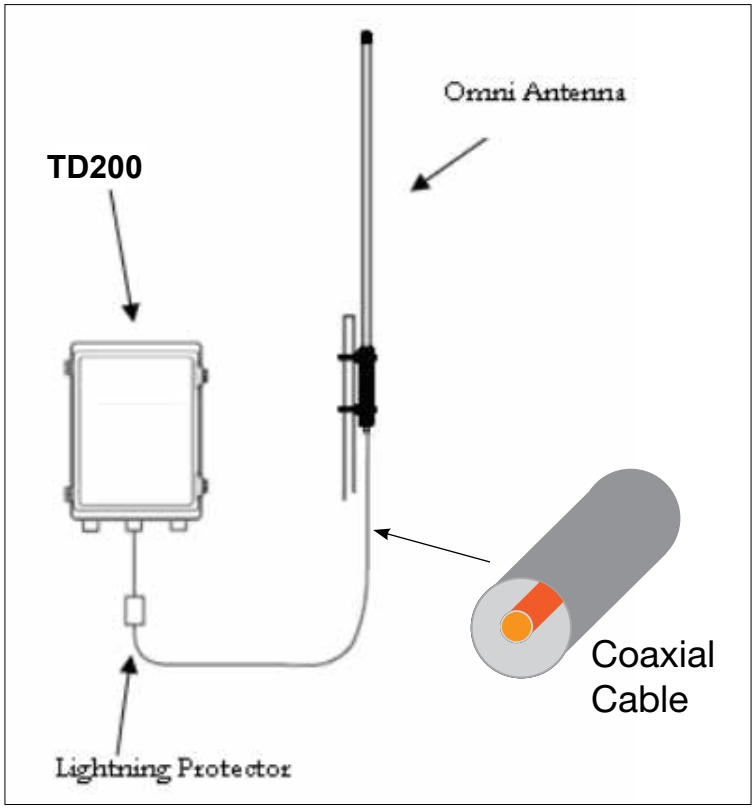
The Nelson Di-pole antenna is rated 2 dBi. The Omni antennas are rated 6 dBi (2.5x more). The longest range is achieved using the Omni antenna. Note: Only the approved antennas can be used for the TWIG network. Here are the kit part numbers:

12000-010	Omni with 10' cable
12000-020	Omni with 20' of cable
12000-030	Omni with 30' of cable
12000-040	Omni with 40' of cable
12000-050	Omni with 50' of cable
12281	Di-pole articulating (no cable)

Each Omni kit includes the following parts:

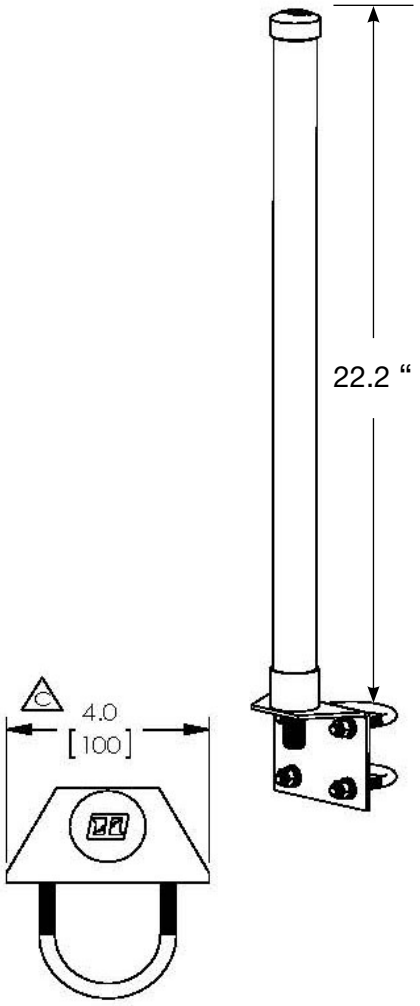
11818	Omni Antenna with u-bolts, +mount
11996-xxx	N to N cable (10, 20, or 30' long)
11865-xxx	RP-SMA to N cable (10' or 20')
11998	Coax weatherproofing tape
11997	Lightning Arrestor with mount

The only difference between these Omni antenna kits is the length of the co-axial antenna cable. The length should be selected carefully because there is some signal degrading within the cable. Length should not be any longer that needed but long enough that it easily connects. An appropriate length will have enough that a small amount of extra cable can be looped to give room for making the connections. The water proof seal tape must be used to keep moisture from entering the cable junctions.

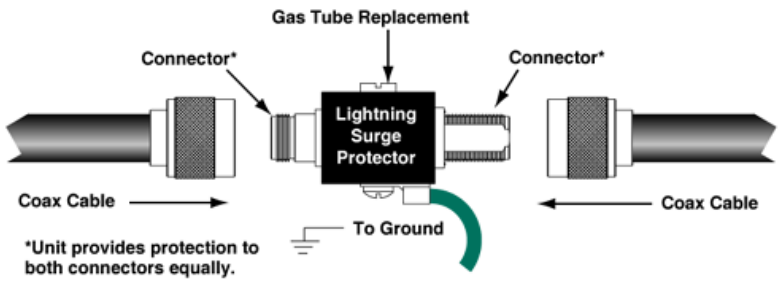


Sharp bends in the co-axial cable should be avoided.

The U-bolts in the mounting kit can be used to mount the antennas onto a round mast up to 2” O.D. (pipe size 1” to 1 1/2” diameter).



The lightning surge protector is to be located in the co-axial cable between the antenna and the device.



NELSON
848 Airport Road, Walla Walla, Washington 99362 U.S.A.
Tel: +1 509.525.7660 / Fax: +1 509.525.7907
nelsonirrigation.com

Antenna Assembly

TWIG ANTENNA KITS INCLUDE:

11818	Omni Antenna with u-bolts and mounting bracket
11865-xxx	RP-SMA to N cable (10 or 20’ long)
11996-xxx	N to N cable (20’ or 30’ long)
11997	Lightning Arrestor with mounting bracket
11998	Coax weatherproofing tape

Please follow diagram below to assemble.

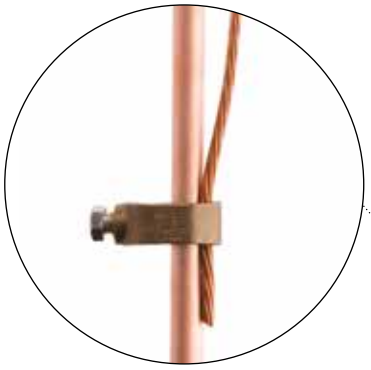
Combinations of cable are necessary for 30’, 40’, 50’ configurations

10 ft. Kit	20 ft. Kit	30 ft. Kit	40 ft. Kit	50 ft. Kit
11865-010	11865-020	20’ 10’ 11996-020 + 11865-010	30’ 10’ 11996-030 + 11865-010	30’ 20’ 11996-030 + 11865-020

NOTE: Copper grounding cable connects to lightning arrestor

WIRELESS DEVICE

Cable connection to wireless device
NOTE: Wrap all cable connections with coax tape.



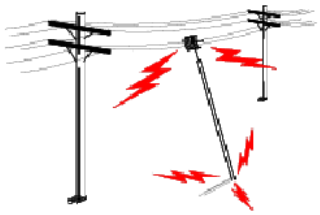
Customer supplied grounding rod and 10ga max copper wire

OUTDOOR INSTALLATION WARNING

IMPORTANT SAFETY PRECAUTIONS:

LIVES MAY BE AT RISK! Carefully observe these instructions and any special instructions that are included with the equipment you are installing.

IMPORTANT: Look over the site before beginning any installation, and anticipate possible hazards, especially these:



CONTACTING POWER LINES CAN BE LETHAL. Make sure no power lines are anywhere where possible contact can be made. Antennas, masts, towers, guy wires or cables may lean or fall and contact these lines. People may be injured or killed if they are touching or holding any part of equipment when it contacts electric lines. Make sure there is NO possibility that equipment or personnel can come in contact directly or indirectly with power lines.

Assume all overhead lines are power lines.

The horizontal distance from a tower, mast or antenna to the nearest power line should be at least twice the total length of the mast/antenna combination. This will ensure that the mast will not contact power if it falls either during installation or later.

TO AVOID FALLING, USE SAFE PROCEDURES WHEN WORKING AT HEIGHTS ABOVE GROUND.

- Select equipment locations that will allow safe, simple equipment installation.
- Don't work alone. A friend or co-worker can save your life if an accident happens.
- Use approved non-conducting ladders and other safety equipment. Make sure all equipment is in good repair.
- If a tower or mast begins falling, don't attempt to catch it. Stand back and let it fall.
- If anything such as a wire or mast does come in contact with a power line, **DON'T TOUCH IT OR ATTEMPT TO MOVE IT**. Instead, save your life by calling the power company.
- Don't attempt to erect antennas or towers on windy days.

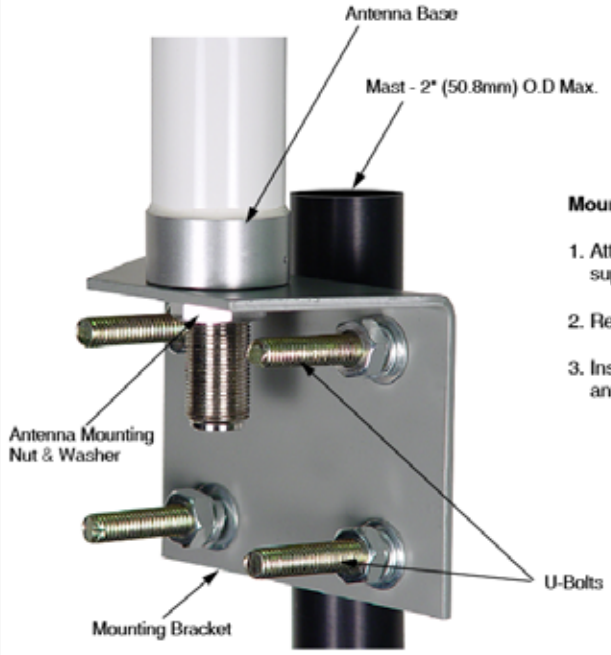
MAKE SURE ALL TOWERS AND MASTS ARE SECURELY GROUNDED, AND ELECTRICAL CABLES CONNECTED TO ANTENNAS HAVE LIGHTNING ARRESTORS. This will help prevent fire damage or human injury in case of lightning, static build-up, or short circuit within equipment connected to the antenna.

- The base of the antenna mast or tower must be connected directly to the building protective ground or to one or more approved grounding rods, using 1 O AWG ground wire and corrosion-resistant connectors.
- Refer to the National Electrical Code for grounding details.
- Lightning arrestors for antenna feed coaxial cables are available from L-com, Inc.

IF A PERSON COMES IN CONTACT WITH ELECTRICAL POWER, AND CANNOT MOVE:

- **DON'T TOUCH THAT PERSON, OR YOU MAY BE ELECTROCUTED.**
- Use a non-conductive dry board, stick or rope to push or drag them so they no longer are in contact with electrical power.
- Once they are no longer contacting electrical power, administer CPR if you are certified, and make sure that emergency medical aid has been requested.

Installation Instructions
Models: HGV-903U and HGV-906U



Mounting Instructions

1. Attach mounting bracket to mast as shown using (2) U-bolts and supplied hardware.
2. Remove antenna mounting bolt and washer from antenna base.
3. Insert antenna into mounting bracket and secure with washer and antenna mounting nut. Do not over tighten.