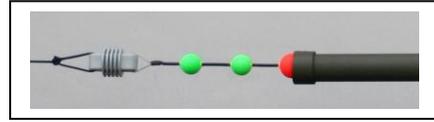


Vari-Ten

TENSIONER™



Protecting Wire Antennas



Installation & Safety Instructions

Important Safety Information About Your Antenna System

This is important system safety information for you to review and understand before installing your Vari-Ten *Tensioner(s)*.

DO NOT STAND DIRECTLY IN LINE WITH, OR IN FRONT OF, OR BEHIND THE BARREL OF A TENSIONER WHILE APPLYING TENSION. If one of the attachment lines break or come loose the Tensioner could recoil and self propel into you or a by-stander causing serious injury or death.

Your antenna wire and all other antenna components must have a breaking strength of 300 lbs or higher. Halyard and halyard support components must have a breaking strength of 700 lbs or higher.

Your entire antenna system will be under tension from end to end, including wire, rope, cable, attachment hardware, pulleys, knots, connectors, insulators, etc...everything. A failure in any part of your antenna system while it is under tension will cause the two remaining sections to "snap back" similar to a tensioned rubber band that breaks. For safety reasons you should give your system a breaking strength review. Be sure that your support ropes connected to the Tensioner have a 700 lb. minimum breaking strength rating and at least 50% higher than the antenna wire. As long as the Tensioner support ropes remain in tact if the wire or an insulator fails, the Tensioner(s) will recoil harmlessly away from the antenna's span and back toward its support tree or structure.

Before you start.....here are some halyard tensioning tips

Antenna halyard tensioning can be very difficult and frustrating if you use the "Armstrong method".... haul down on a thin slippery rope and try to tie a knot in it with gloved hands...and not let the rope slip. This job can be fast and practically effortless if you use some form of mechanical advantage to do the work for you. Here's how to make it easy.... (also refer to photos on p. 4)

1. Tie a 4" loop knot in the halyard rope to form a attachment point about 6-8' above the ground. Or as an alternative, attach a Maasdam Fence Wire Grip to the halyard. They're available from Home Depot and hardware stores for about \$20 and work perfectly on 3/16"-5/16" Dacron rope. You can also purchase one at www.antennatensioner.com.
2. Secure two large eye screws to your support tree...one about a foot above ground and the other about waist high. The first one is an anchor point for your "come-along" or small block & tackle. The waist high eye screw is a guide hole and anchor point for the halyard.
3. Attach your "come along" or block and tackle between the halyard loop knot and the bottom eye screw.
4. Apply the desired tension to the halyard rope while guiding it through the upper screw eye. Tie off the halyard to the upper screw eye or to a different anchor point when tensioning is complete.
5. An alternative method is to attach a 5-6 gallon bucket to the 4" loop knot or attach the bucket to a Maasdam Power Pull Fence Wire Grip clamped to the halyard. Gradually fill the bucket with water from a garden hose until you get the tension that you need and then tie off the halyard rope to the eye screw. Water weighs 8.3 lbs/gal.
6. Hammer two 8" spikes into the tree about 2' apart to make a convenient and inexpensive cleat where you can wind up the extra halyard rope.

One or Two *Tensioner* Installation? This installation guide covers the basic steps for a single *Tensioner* installation. For a two *Tensioner* installation (Main & Reciprocal units), install a *Tensioner* at each end of your antenna and repeat the installation steps for each unit. **Allow 10' at the end of your antenna for each *Tensioner* so that they can fully expand.**

Select your support tree(s)

Large and rigid trees with more stable trunks such as mature oaks or large hardwoods will have minimal sway as compared to tall spindly trees like immature pines. If you have a choice, select trees that are as large as possible with the greatest rigidity when it's windy. Apply common sense judgment...the bigger the tree trunk, the less sway. If the support trees have lots of wind sway (greater than a foot or two) play it safe and use two *tensioners*...one at each end of your antenna. Two *tensioners* will have twice the sway distance but the same static working tension of a single unit. Two *tensioner* installations make a very conservative and stable installation where the antenna has minimal horizontal movement even in high winds. There are no magic formulas so use your best judgment. *Tensioners* have a very high point of failure (>350lbs) so it is an important safety point that your support halyards are always maintained in good condition and have at least a 700 lb or higher strength rating. New 3/16", 1/4", or larger Dacron rope is recommended.

Install your halyards in the support tree(s)

First you must install halyards in the tree tops where you want the *Tensioner(s)* and antenna positioned. If possible, position your support halyards over a branch where it joins the tree trunk. This will be a point that has the least amount of wind sway movement. The use of halyard support pulleys is not necessary but it is a big plus and will make it much easier to adjust the *Tensioner* and raise and lower the antenna for adjustments. This is especially true with the 30-100 lb models where static tension is set at 30-50 lbs. If you decide to use halyard pulleys, remember that they must be located as close to the tree trunk as possible. Vectored forces from the horizontal antenna and vertical halyard will cause the antenna's height to be reduced by the same distance that the pulley extends beyond the trunk.

Unlike a counter weight halyard that can chafe and wear as it moves up and down through the branches, the *Tensioner* halyard will be stationary.

Raise the *Tensioner(s)* and position it

Attach your antenna to the insulator (and/or cable thimble on Reciprocal units) and pull on the support halyard to raise the *Tensioner* and end of the antenna to its tree top location. Position it as close to the tree trunk as possible but with the end of the barrel visible from the ground. If needed, add additional Dacron "spacer line" between the *Tensioner* insulator and end of the antenna to position the antenna where you want it. You want the *Tensioner* to disappear (or nearly so) in the tree top canopy of branches and foliage. Adjust the support halyard so that you can see the brightly colored calibration markers when they exit the end of the barrel. Once the *Tensioner* is correctly positioned, tie off its halyard. Then go down range and apply tension to the halyard at the opposite end of the antenna wire. Even at a distance you can see the colored calibration markers begin to exit the barrel as you pull on the halyard. Observe the colored markers and adjust the tension to your desired "working" tension per the following table. Now tie off the antenna halyard and your *Tensioner* installation is complete. You can "tweak" the tension adjustments by using either halyard.

How to accurately adjust antenna tension.

Your *tensioner* has accurate calibration markers (bright white, green, and red spheres) that emerge from the barrel when the antenna is taught and you pull down on the on the *Tensioner* support halyard or the other halyard at the far end of the antenna. Tension is continuously variable. When you reach one of the exact calibration points the colored sphere will be fully visible and completely out of the barrel.

Model 20-50				Model 30-100			
Applied Tension	Marker Color						
*20 lbs	White	40 lbs	Red	*30 lbs	White	70 lbs	Green
*25 lbs	White	45 lbs	Green	*40 lbs	White	80 lbs	Red
30 lbs	Red	50 lbs	Red	*50 lbs	White	90 lbs	Green
35 lbs	Green			60 lbs	Red	100 lbs	Red

* Shaded areas define the range of working (static) tension

After you have positioned the *Tensioner(s)*, pull on the support halyard at the far end of the antenna until you reach your desired working tension while observing the white markers. It is best to not exceed the maximum recommended working tension (up to 25 lbs for model 20-50 and up to 50 lbs for model 30-100). Adjust the tension so that you have a nicely tensioned span. Use the least amount of tension that satisfactorily tightens the antenna wire.

Adjusting tension on a two *Tensioner* system. Both basic antenna *Tensioner* models (Models 20-50 & 30-100) are available in a “Reciprocal” version designed specifically for use in a two *Tensioner* installation where units are installed at each end of the antenna.

In a two *Tensioner* system, antenna tension is adjusted by observing the white calibration markers on basic unit #1. Because both *Tensioners* are connected together by the antenna, Unit #2 (Reciprocal unit) “reciprocates” and automatically extends its cable to the same tension. Two *Tensioners* will compensate for two times the tree sway displacement of a single unit and the total cable travel distance is doubled. Antenna tension can be “tweaked” by tensioning the halyard on either *Tensioner* after they are hoisted to their operating position.

When the wind blows and the tree sways you will see the calibration markers moving in and out of the barrel. This is your indication that the *Tensioner* is doing its job and working properly.

Vertical and angled installations

CAUTION *If the tensioner is installed vertically or at an angle be sure to mount it with the weather sealed end up (halyard end). This will prevent rain water from entering the open end of the barrel and accumulating at the enclosed weather sealed end.*

What about very high wind or ice conditions?

The *Tensioner* end insulator has a tensioned travel distance of 2.6 feet. Beyond 2.6 feet the “soft stop” feature engages and applies greatly increased tension up to 3.4’ travel distance and 350 lbs. Failure to function can be expected between 350 and 450 lbs. The trunks of most mature trees will seldom sway more than two feet or so during strong wind gusts. If there is doubt, use two *tensioners*, a main unit and a reciprocal unit at the other end. This will provide for a combined sway displacement of about 5’ feet within the range of working tension and will give you an exceptional antenna installation.

Full storm, tropical storm and hurricane wind conditions or severe icing can create havoc with just about all trees and antennas, no matter what. Violent and extreme motion can be expected during these events that could result in very high tension for prolonged gust periods. The *tensioner* will likely survive because of its “soft stop” feature and very high failure strength. However your entire antenna system may be stressed beyond it’s breaking limit. For safety reasons it is very important that the halyards are not the weak link and can sustain 700 lbs or more. Whenever a strong storm event or heavy icing is forecast it is simply good practice to play it safe and either lower your antenna to the ground or ease off on the halyard to put lots of slack in the antenna.

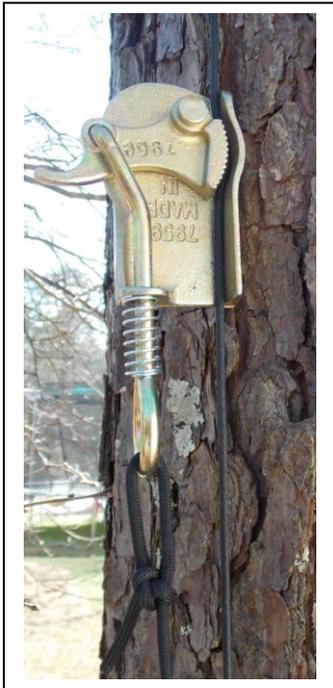
Maintenance and sun exposure

Tensioners do not need any maintenance. However if you lower your antenna periodically for routine inspections you will notice that the *Tensioner* calibration markers may show signs of UV exposure and color abrasion where they slide back and forth in the barrel. In horizontal installations only, the PVC barrel may also develop a very slight amount of sag from heat exposure. The barrel eventually conforms to the gravitational sag of the tensioned interior spring. This is normal and to be expected and will not affect the *Tensioner*’s performance. The white markers are vinyl coated, self-cleaning and UV resistant. The expansion spring is yellow zinc phosphate electroplated with excellent moisture and corrosion resistance.

Additional helpful information

For complete specifications, installation photos, technical data, features & benefits, and Q&A’s about Vari-Ten Wire Antenna *Tensioners* please visit our web site at:

<http://www.antennatensioner.com>



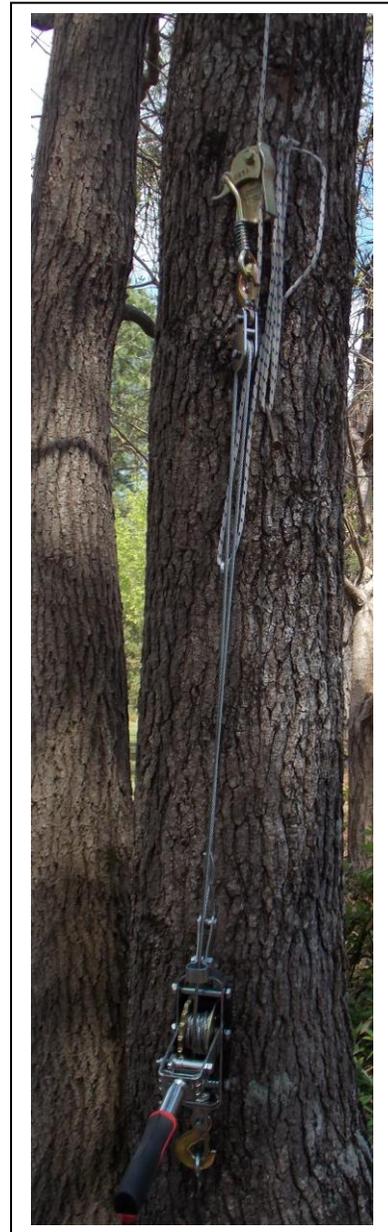
A



B



C



D

Rope Halyard Tensioning Tips

- A A *halyard grip tool* can be positioned anywhere on the rope and moved up or down as needed. A water bucket, ratchet winch, or block & tackle can be attached to it to provide the pull down tension for adjusting your *Tensioner*.
- B A 5/6 gal. bucket can be filled with water from a garden hose to tension the halyard. Water weighs 8.3 lbs/gal.
- C Tie a loop knot in the halyard about 6-8' up and use it as an attachment point for a water bucket, block & tackle, or ratchet winch.
- D A ratchet winch or block & tackle should be anchored to a screw eye located near the ground.