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Installation Instructions
AS-AYL-4 WM
Array Solutions K9AY Loop Wire/Mast Kit

Thank you for your purchase of the **AS-AS-AS-AYL-4** mast and antenna Kit. We chose **Emcomm-Products LLC**, at www.EmComm-Products.com to build this product, since they build Mil-spec quality. We hope you also will appreciate the quality and effort that went into this fine product.

All materials required for the installation of your receiving loop system, have been included in this kit with the exception of those items listed below under the heading; 'You will also need.' The specified 8' x 5/8" copper-clad steel ground rod can be purchased at just about any local hardware store or home center.

Kit contains the following:

- (4) 72" x 1.5" x 1/8" Fiberglass Mast Sections
- (4) 18' Lengths of 1/8" Double-braided Dacron Rope
- (4) 1.5' Lengths of 1/8" Double-braided Dacron Rope
- (4) 4' Lengths of 1/8" Double-braided Dacron Rope
- (2) 88' Sections of 13 AWG Insulated Antenna Wire
- (4) 12" 6061-T6 Aluminum Anchor Stakes
- (4) ¼" thick, UHMW-PE Mid-point Loop Insulators
- (4) Budwig® HQ-2 Polymer Strain Insulators
- (4) Clamcleat® CL-260 Nylon Line-Loks®
- (2) 3" Custom 5-hole Acetal resin Guy Rings
- (1) 6061-T6 Ground Ring w/¼-20 3/16" 18-8 S.S. Set Screw
- (1) 6061-T6 Mastfoot w/2, ¼-20 x 1 ¼" 18-8 S.S. Hex Bolts

You will also need:

- AS-AYL-4 Control Box/Relay Box, NOT included
- Coax & Control cable from antenna to shack (direct-bury types recommended; NOT included)
- Coax connectors, NOT included
- 5/8" x6' or 8' copper-clad Ground Rod, NOT included
- A friend to help you
- Radial Wire, if you need radials for poor soil conditions

Required tools:

- Hammer or other means of driving both the Ground Rod & Anchor Stakes into the ground
- Measuring tape (25 foot recommended)
- Wire cutters/strippers
- Adjustable Wrench, 7/16 Open or Box-end Wrench or Socket w/handle
- 1/8" Allen Wrench
- Shovel, spade or other tool(s) for digging a shallow hole and trenching the coax and control cables to the shack

Required Area:

18 feet is required in four directions, around the base of the mast and Ground Rod, even if you plan on adding additional Ground Radials. The supplied Ground Ring will allow the attachment of up to 16 such radials using ¼-20 S.S. hardware, NOT supplied. Please note directional layout requirements.

Step-by-Step Installation Instructions:

1. Check kit contents against the supplied parts list. If you are missing anything; please contact Array Solutions by telephone at **972-203-2008**, or email us at **sales@arraysolutions.com**

Location:

2. Select the location of the antenna base according to the *Required Area* specifications above. Make sure to avoid putting the Ground Rod through buried utility cables or pipes, by checking with local utility locator services in your area. Also be aware of overhead hazards, such as power lines and other obstructions

WARNING: YOU CAN BE KILLED IF YOU SHOULD PENITRATE A BURIED POWER LINE WITH THE GROUND ROD, OR CONTACT OVERHEAD ELECTRIC LINES!
ALWAYS CHECK WITH YOUR LOCAL BURRIED UTILITIES LOCATING SERVICE BEFORE ATTEMPTING INSTALLATION AND DO NOT ATTEMPT INSTALATION IN AN AREA WHERE YOU HAVE THE SLIGHTEST CHANCE OF COMING INTO CONTACT WITH OVERHEAD WIRES!

Chose a site that is well away from metal structures such as towers, your transmit antenna, chain link fence, etc. We have successfully used the loop on our test range 50 feet away from the transmit antenna and 10 feet away from a metal fence. But keeping it in the clear is always better.

Install the Ground Rod:

1. Drive the Ground Rod, using a sledge hammer or special tool made specifically for this purpose. Drive it straight and plumb, and avoid beating up the end so badly, it won't allow the included aluminum Mastfoot being installed over it. If you do damage the top of the ground rod; use a grinder or large file to remove the "mushroom" around the head, to allow clearance for the Mastfoot to be installed over it.

CHECK WITH YOUR LOCAL UTILITY LOCATOR SERVICE BEFORE DRIVING THE GROUND ROD, TO AVOID EXPENSIVE DAMAGE TO UNDERGROUND UTILITIES, PERSONAL INJURY, OR DEATH!

2. When you have driven the rod almost fully into the ground, stop a moment and dig around the rod to a depth of about six to eight inches. You want the top of the rod below ground level or just at ground level, especially if you chose to use a radial system.

Preparing to Assemble the Mastfoot/Grounding Ring:

1. After digging around the top of the ground rod, drive it the rest of the way into the ground until the top is about three to six inches below ground level if you desire to bury ground radials. You may leave it at ground level if you want to lay radials on the ground, or not use radials at all. Take the Mastfoot (aluminum cylinder about 1-1/4" OD by 6" long) from the parts bag. You'll notice this part has two holes in it, drilled and tapped for the included 1/4-20 stainless-steel hardware. With the end having the holes pointed down, place this part over the top of the ground rod about two inches or so. Insert the two included 1" x 1/4-20 stainless-steel bolts into the threaded holes at the bottom of this part and tighten them against the side of the ground rod. Tighten them a couple of turns each; just enough to center the Mastfoot over the Ground Rod and to make good mechanical and electrical contact between them. Next, take from your kit, the aluminum part with holes drilled all around its perimeter. This is the Grounding Ring. Look carefully at this part and you will notice there are four of the holes that are smaller than the others and 90 degrees apart. You'll also notice it has a flange with a single hole drilled and tapped in it. In this hole should be a 1/4-20, stainless-steel set screw. Holding the grounding ring with the flange down, place it over the Mastfoot you assembled previously onto the Ground Rod. With the bottom of this flange is just above the two bolts in the Mastfoot, and with its hole centered between them; tighten the included 1/8" Allen-head set screw until it holds this Grounding Ring in place and makes a good electrical connection to the Mastfoot. DO NOT over-tighten, or you may strip the threads! Remember, the bolts and set screw are stainless-steel, while the threaded holes are cut from aluminum. The top of the Mastfoot/Grounding Ring assembly should now be just a few inches above ground level and tightly fixed to the ground rod.

Preparing to Assemble and Raise the Mast & Loops:

1. Your kit is supplied with four (4) six foot fiberglass Mast Sections. Except for the #4 or top mast section; (the part with the shorter insert, with the black top-cap), all are identical. This top section MUST be used as the #4 or uppermost section of the mast. The remaining three sections are the same and maybe used in any order, below the top.

#4, Fourth or Top Mast Section

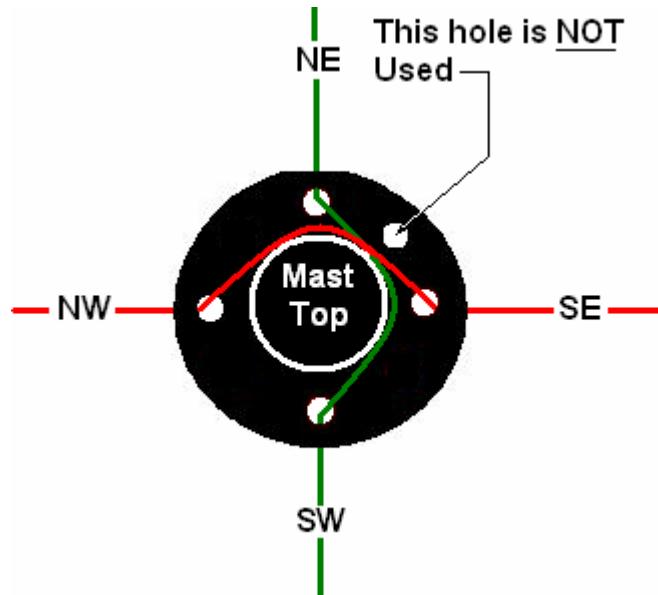
#3, Third Mast Section

#2, Second Mast Section

#1, First or Bottom Mast Section

2. The mast is assembled top (#4) to bottom (#1). Remove one of the two (2) 88 foot rolls of insulated wire from your kit. Carefully unroll this wire and double it, so both ends are together. Remove one of the two (2) black Guying Rings from your kit and place this over the top mast section. You'll notice there are five holes drilled into the Guying Ring.

3. You will use four of these five holes; those that are 90 degrees apart. Take one end of the folded wire and place it through one of these holes from the top and carefully pull the wire completely through until you come to the point where it was folded in half. Once this point has been reached, take the other end of the wire and place it through the opposite hole in the Guying Ring until it too, has been pulled completely through. This should leave only a small loop of wire above the ring. With the Guying Ring fully down over the top of the mast, place this small loop of wire around the top of the Mast Section and pull both ends of the wire until they are again together and the loop is tightly around the top of the mast section. Repeat this procedure with the other 88 foot piece of wire, until the top of the mast looks something like the drawing at the top of the next page, and all wires are equal length.

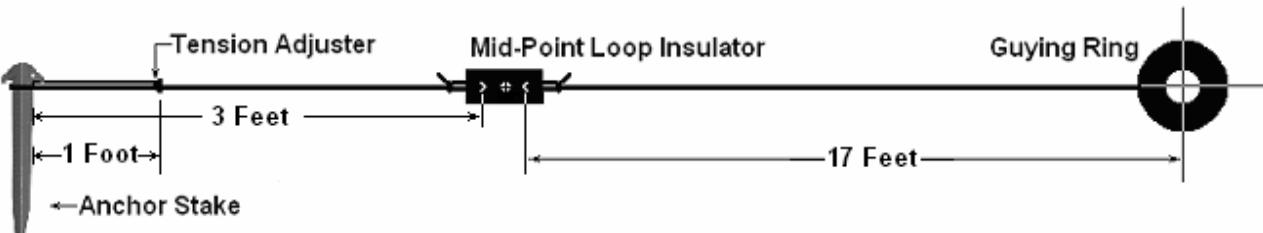


4. Now that you have both pieces of wire as shown in the drawing above, you have completed assembly of the top or fourth Mast Section. Set this aside for latter use. Take another of the three remaining mast sections and insert the top of this section (#3), into the bottom of the top or #4 section you completed above. You have now completed assembly of half of the mast and are ready for the #2 section. Have a friend hold the two Mast Sections you now have assembled in a vertical position, bottom of the third section resting on the ground, while you proceed to the next step.

5. Take the #2 mast section and place the second of the two Guying Rings from your kit, over its top. Take four of the eight, 18 foot pieces of 1/8" rope from your kit and insert these one at a time, through the four, 90 degree holes in the Guy Ring from the bottom. In each rope, tie an overhand knot in the end you just placed through the Guying Ring holes to prevent it pulling through them. Carefully unwind all these ropes and lay them out on the ground in such a way as to prevent them becoming entangled. Have your friend raise the other two assembled mast sections straight up and place this section's top, into the bottom of the #3 section. Your friend can now relax a moment, as he or she continues to hold these three interlocked sections in a vertical position, the bottom-most section resting on the ground.

Installing the Mid-Point & Strain Insulators and Anchor Stakes:

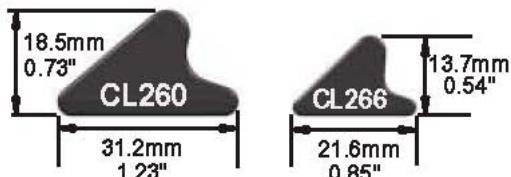
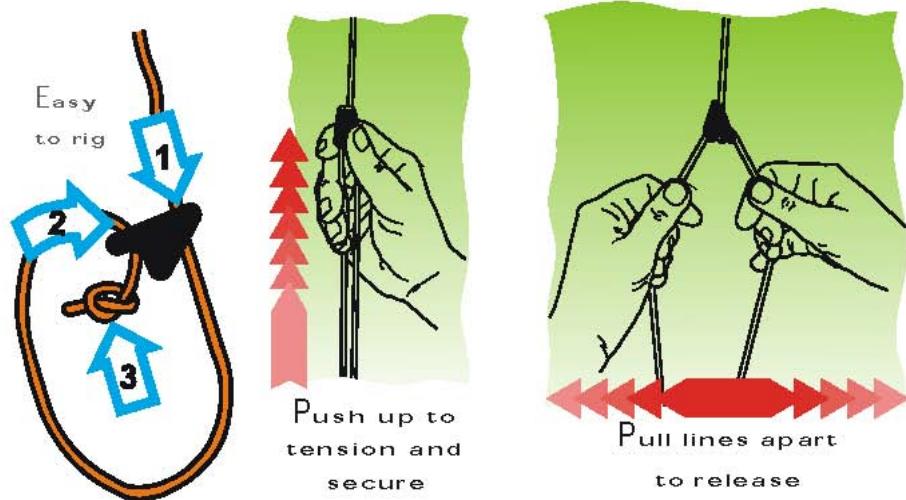
1. Next, remove the four (4) Mid-Point Loop Insulators. These are made of black, UHMW-PE, $\frac{1}{4}$ " thick, rectangular, with three, $\frac{1}{8}$ " holes drilled in them. On the ends of each of the four, 18 foot ropes you tied to the middle Guying Ring earlier; tie one of these insulators, using one of the holes in their ends. Use a bowline or a couple of half-hitches, while adjusting the length of the rope until it is **EXACTLY 17 feet** from the center of the attached Guying Ring, to the middle hole in this insulator. Refer to the drawings below for this adjustment. You will do this with all four of these guy ropes and Mid-point Insulators.



2. Next, while your friend continues holding the mast for you; pass the lower ends of each of the loop wires through the center hole of one of the four Mid-point Insulators; until all four of the insulators have a wire going through them.
3. Take the remaining four (4), four (4) foot pieces of rope from your kit and tie these through the remaining end holes in the Mid-point Insulators. When completed, each of your four mid-point guys should look something like the second drawing above; minus the Anchor Stake and Tension Adjuster. These will be installed next.
4. Using the drawing below as a guide; install one of the included CL-260 Line-Lok® tension adjusters on the end of each of the four guys you just completed in step 13. Once complete, your four mid-point guys should look like the drawing above, minus the anchor stake. The anchor stakes will be installed in the next step.

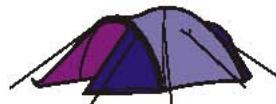


Line-Lok® instructions



• 2 - 5 mm
($\frac{1}{16}$ " - $\frac{3}{16}$ ") Ø
• 2.2gm.
0.08oz.

• 0 - 3 mm
($\frac{1}{16}$ " - $\frac{1}{8}$ ") Ø
• 0.5gm.
0.02oz.



The world's best guy runner. Locks lines securely. Will not slip.

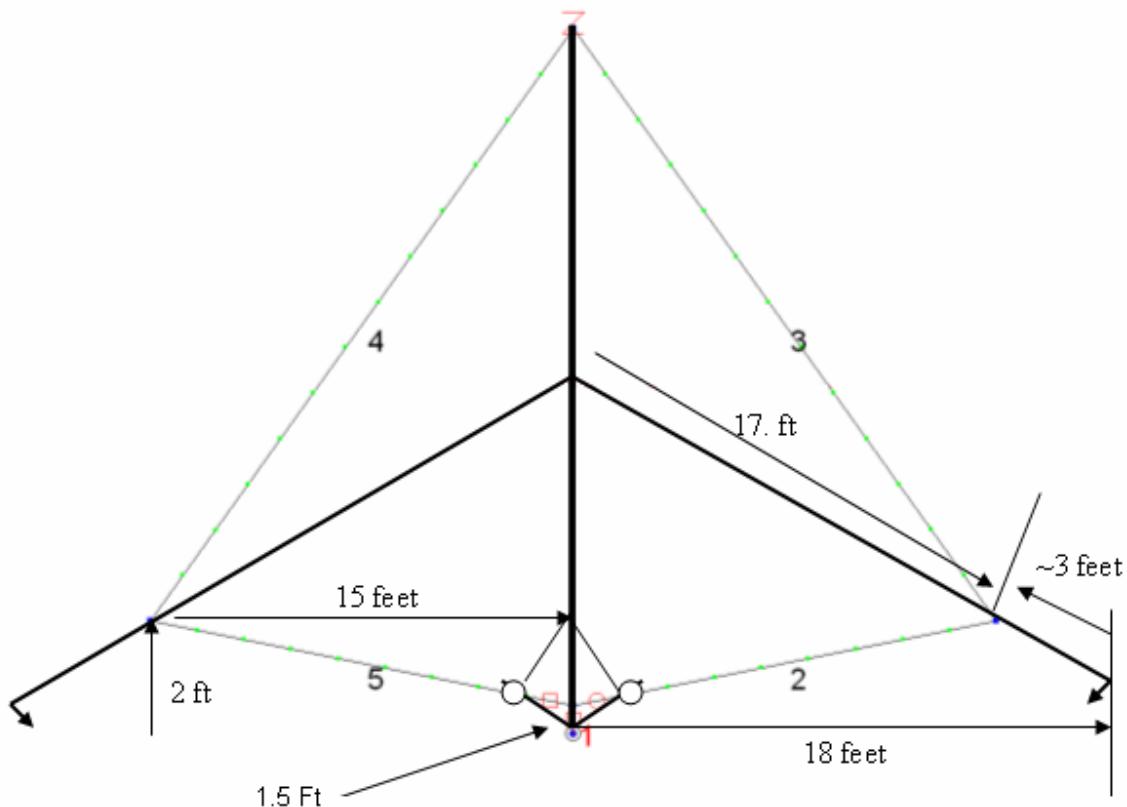
www.line-lok.com

5. While your friend continues holding the three mast sections assembled earlier in a vertical position; go around the mast and holding the anchor stakes with their open sides facing the mast, hammer each into the ground until only about 2 inches or so remains above ground level. These stakes should be placed as shown in the next drawing, about 18 feet or so, from the mast, at the 90 degree points NE-SW, NW-SE.

AS-AYL-4 Directional Receive Loop Antenna

----- ANTENNA DESCRIPTION -----

EZNEC+



Ropes

Qty	Length	Use
4	1.5 feet	Insulator to radial ring
4	4 feet	Insulator to stake of which 3 feet are used 1 foot folded back to tensioner
4	17.5 feet	Guy rope to insulator

6. Now place a guy rope over each of the stakes and adjust the lines until they still have enough slack in them to allow you to install the last remaining mast section. Place the top of the remaining section into the bottom of the bottom-most section of the three-section assembled mast; then place the bottom of this section over the previously installed mast foot/grounding ring assembly until it sits firmly down over the mast foot and comes to rest atop the grounding ring. Go round to each stake and re-adjust the tension of each guy. This completes the mast assembly.

7. Refer to instructions supplied with the Control/Relay boxes for their installation procedures.
8. When you're finished the center point should look like the following picture.



Enjoy your low band antenna system.