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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.

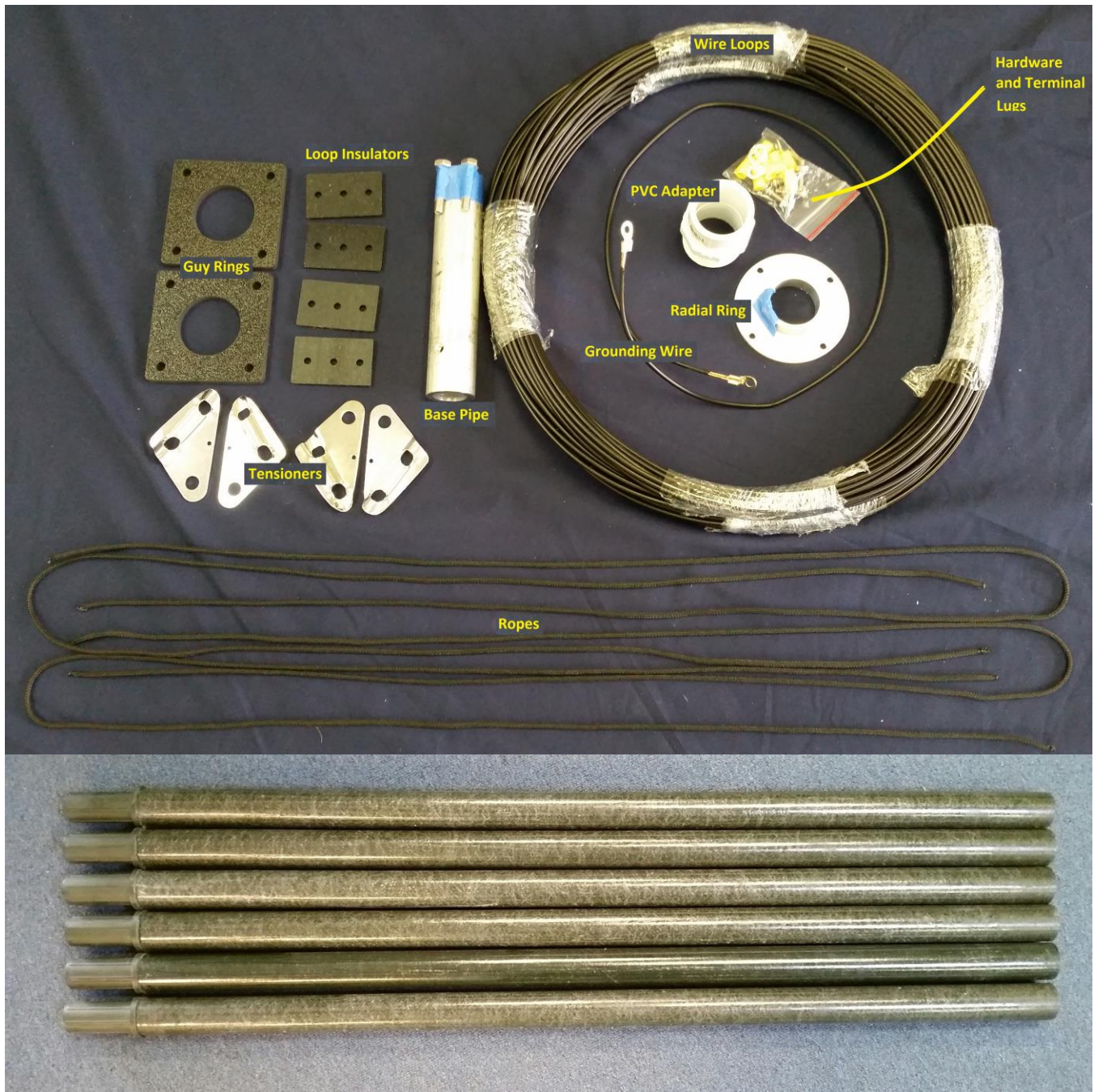
All materials required for the installation of your receiving loop system, have been included in this kit with the exception of those items listed below under the heading; '*You will also need.*' The specified 8' x 5/8" copper-clad steel ground rod can be purchased at just about any local hardware store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

The kit contains the following:

- (6) 48" (effective length 44.5") fiberglass poles (**Only supplied with the AYL-4 MW Kit**)
- (4) 4' Lengths of 1/8" Double-braided Dacron Rope
- (2) 88' pieces of 14 AWG Insulated Antenna Wire
- (4) #10 Eye lugs to terminate the wire loops.
- (4) #10 Eye lugs and its hardware to connect radials if used.
- (1) 2.5 feet #14 grounding wire
- (4) Anchor Stakes
- (4) 1/8" thick, UHMW-PE Mid-point Loop Insulators
- (4) Rope Tensioners®
- (2) 3" Custom 4 or 5-hole Acetyl resin Guy Rings
- (1) 6061-T6 Ground Ring with 1/4-20 3/16" 18-8 Set Screw
- (1) 6061-T6 Mast foot with 2, 1/4-20 x 1" 18-8 S.S. Hex Bolts
- (1) 1/4" PVC adapter to fit the bottom guy ring with the mast foot. (**Only supplied with the AYL-MW Kit**)
- (4) #8-32 x 3/4" SS phil pan screw
- (4) #8 SS split washer
- (4) #8-32 x 3/4" SS hex nut

You will also need:

- AS-AYL-4 Control and Relay Boxes, NOT included in the M & W kit.
- 50 ohm coaxial cable & six conductor control cable, from antenna to shack. (direct-bury types recommended; NOT included)
- Coax connectors, NOT included
- Tie-wraps to attach the relay box to the mast
- 6' or 8' x 5/8" Ø copper-clad Ground Rod, NOT included
- A person to help you
- Radial Wire, if you need radials (at least 18' long) for poor conductivity soil conditions



Required tools:

- Hammer or other means of driving both the Ground Rod and Anchor Stakes into the ground
- Measuring tape (25 foot recommended)
- Wire cutters/strippers
- Adjustable Wrench, 7/16" Open or Box-end Wrench or Socket with handle
- 1/8" Allen Wrench
- A crimping tool for the eye lugs or any other means to compress the eye lugs.

Required Area:

19 feet is required in four directions, around the base of the mast and Ground Rod, even if you plan adding more Ground Radials. 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 **214-954-7140**, or email us at **sales@arraysolutions.com**
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 PENETRATE A BURIED POWER LINE WITH THE GROUND ROD, OR CONTACT OVERHEAD ELECTRIC LINES! ALWAYS CHECK WITH YOUR LOCAL BURIED UTILITIES LOCATING SERVICE BEFORE ATTEMPTING INSTALLATION AND DO NOT ATTEMPT INSTALLATION 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, 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 Mast foot / 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 four holes drilled all around its perimeter. This is the Grounding Ring.

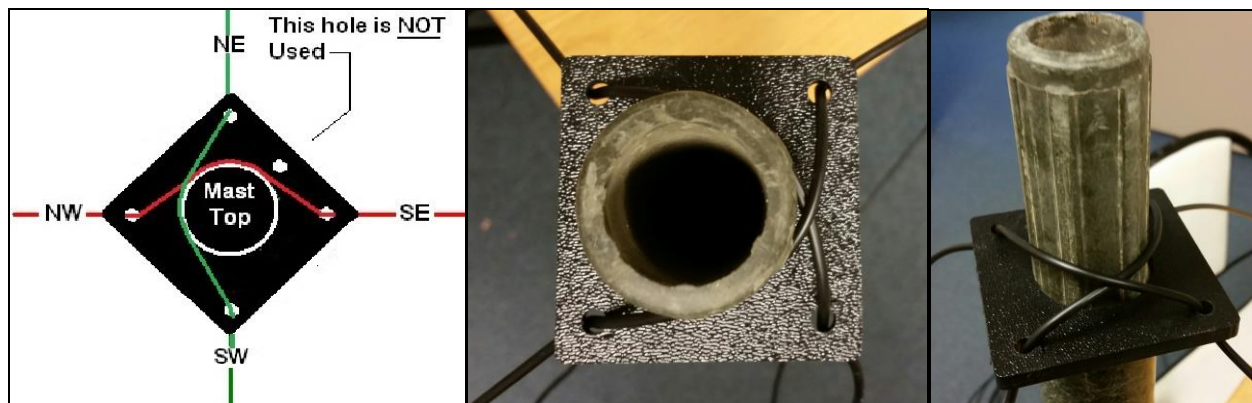
You'll also notice it has a flange with a single hole drilled and tapped in it. In this hole should be a ¼"-20, stainless-steel set screw. Holding the grounding ring with the flange down, place it over the mast foot you assembled previously onto the Ground Rod. With the bottom of this flange is just 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. Slide the 1-¼" PVC adapter with the thread side looking down, then slide the bottom guy ring on it. This assembly is now ready to receive the mast when totally assembled.



Sequence of base assembly, from the grounding rod to the first mast pipe section

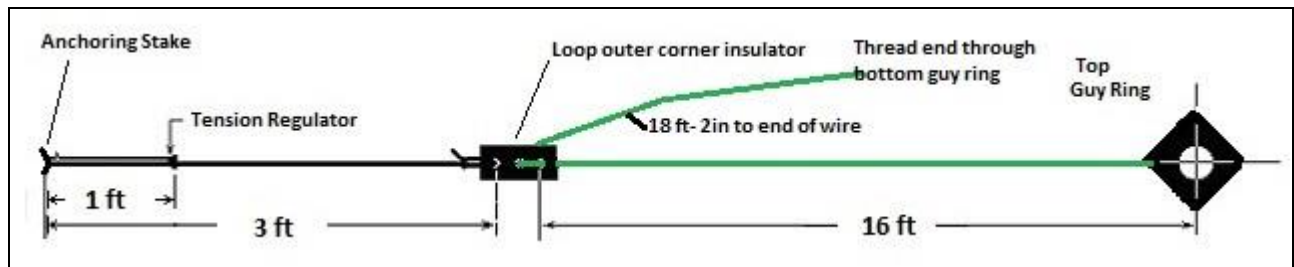
Preparing to Assemble and Raise the Mast & Loops:

1. Take one of the six 4 feet fiberglass Mast Sections, install one of the two guy rings provided on top as shown in pictures below.
2. Take one of the two 88 feet rolls of insulated #14 wire from your kit. Carefully unroll this wire and double it, so both ends are together and make a bend at the center for reference during the next steps. Take one of the two black Guying Rings from your kit and place this over the top mast section. You will notice there may be four or five holes drilled into the guying ring.
3. You will use the four holes at the corners; 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 is reached, take the other end of the wire and place it through the opposite hole in the Guying Ring until it has been pulled completely through until reaching the midpoint. 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 feet piece of wire, until the top of the mast looks something like the following drawing and pictures, and all wires are equal length.



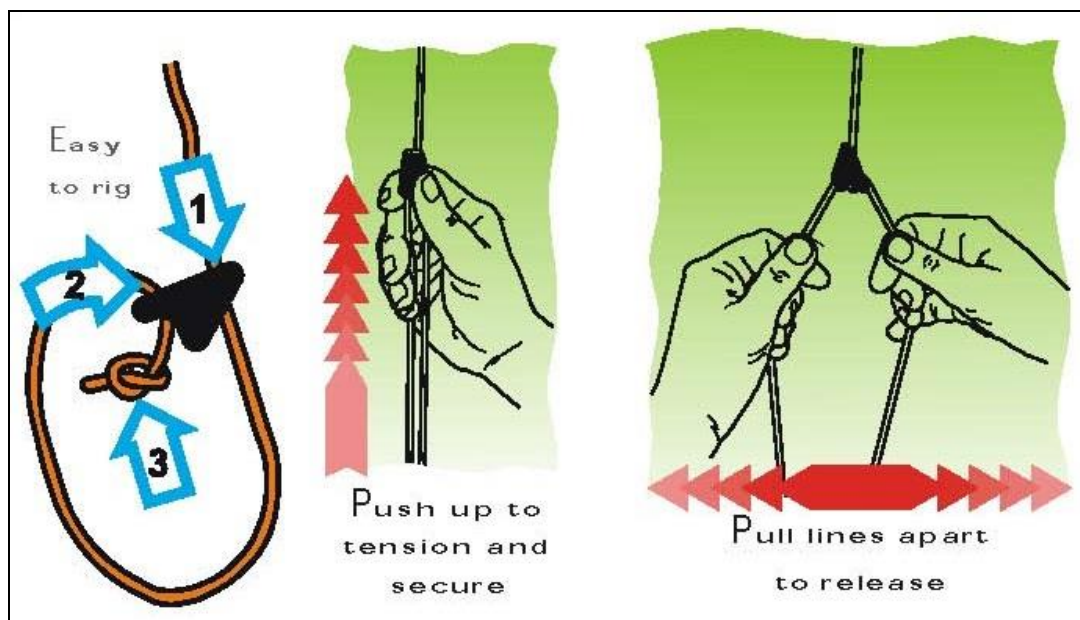
Detail of loop wires installation at top of mast.

4. Now that you have both pieces of wire as shown in the drawing above, you have completed assembly of the top mast section. Set this aside for latter use. Next, assembly three of the remaining five sections of mast together laying on the ground and put the top section as well. Now, the mast is partially assembled and ready to be brought into the vertical position and lifted to insert the two remaining sections and set on top of the base assembly
5. Take one of the rectangular insulators with three holes drilled on them and while having it on a vertical plane, insert the end of one of the loop wires through the top hole until approximately 18 feet and 2 inches have passed through it and, making a "U" turn, insert the end through the middle hole. Tie one of the 4 feet lengths of rope to the remaining (bottom) hole. The other end of this rope will be threaded through the stake hole and will use one of the tensioners provided in the kit.
6. Thread the end of the wires through the bottom guy ring from underneath and going upwards to later install the eye lugs and connect them to the corresponding screw in the relay box. Approximately two feet of wire should be left from the guy ring to the end of the wire.



Top view showing layout of wire, loop outer corner insulator, rope, tension adjuster and stake. Dimensions shown are horizontal distances, see page 10 for an elevation view.

7. 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. Once complete, your four mid-point guys should look like the drawing above, minus the anchor stake. **NOTE: If the tensioners sent along with your kit are the metallic triangles, please refer to the proper picture below.**



CL-260 Line-Lok tension adjuster instructions.



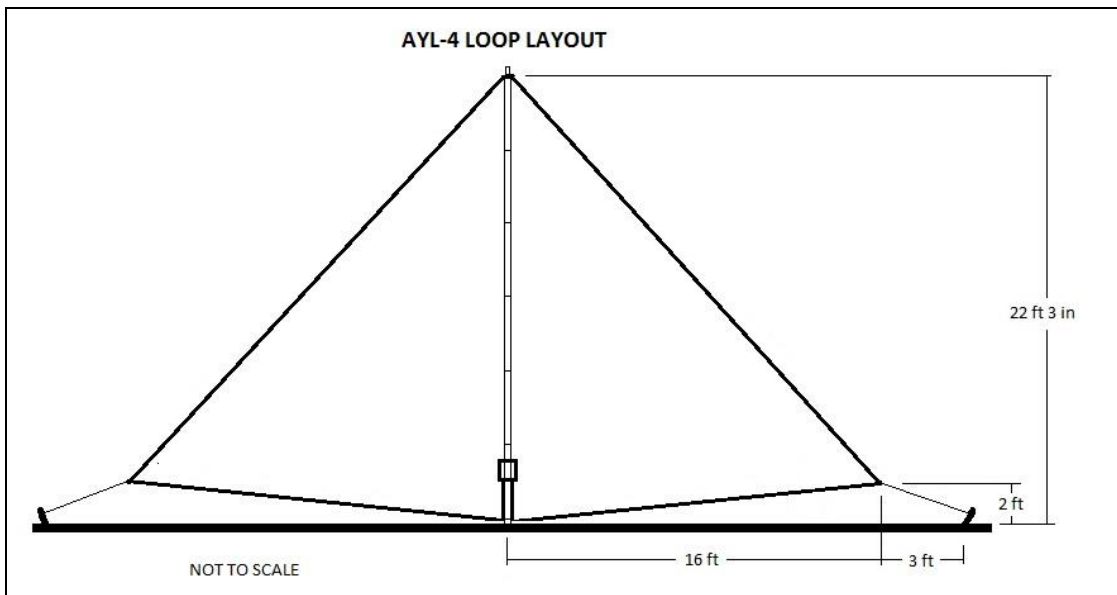
Triangle tensioner installation. See insert for rope threading. Rotate it counter-clock wise for tension release and adjustment.

8. Next, drive the stakes into the ground with their open sides facing the mast, hammer each into the ground until only about 2 inches or so remain above ground level. These should be placed as shown in the next drawing, about 19 feet from the mast, at the 90 degree points NE-SW, NW-SE.

9. While your help continues holding the four mast sections assembled and already in a vertical position; go around the mast and regulate the tension of the ropes and wires to be able to raise the assembled part of the mast and lift it from the ground leaving enough room to insert one by one the two remaining pieces and at the same time keeping the mast more or less in the vertical position with the help of the wires tension.

10. Once the mast has its six sections installed proceed to thread the ends of the wires through the bottom guy ring and attach the relay box setting a distance of about 19 inches from the bottom of the box to the bottom guy ring. Install the eye lugs provided at the ends of the cables and connect to the corresponding terminal screw on the relay box.

NOTE: All the lengths and distances mentioned here may vary a bit depending on the tension applied to the ropes and wires and the topography of the area where the antenna is installed.



Loop and anchoring layout.

11. Refer to instructions supplied with the Control/Relay boxes for their installation procedures.

Not including the grounding wire, control cable and the coaxial cable, when finished, the center point should look like the following picture:



View of the bottom section of mast and relay box installed with the two loops connected.