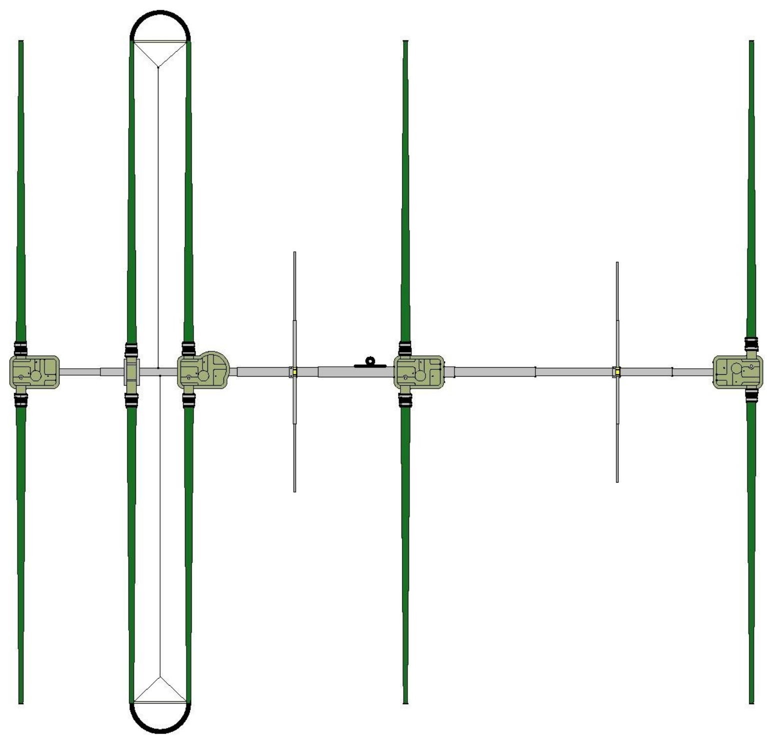
# *4 Element Yagi Instruction Manual*



Other manuals useful to reference for installation of 4E 20m-6m Antenna / 40m-6m Yagi:

1. Go to: https://consumer.steppir.com/support/files/
2. Select 40/30 loop installation instructions
3. Select connector junction box users manual
4. Select diverter cone assembly procedure
5. Select 40/30 loop upgrade for 2, 3 and 4 element Yagi
6. Look at recently upgraded 3E Yagi Instruction Manual

Note the 2, and 4 element Yagi manuals are in process of being upgraded. We apologize for this inconvenience!

**REV 5.7**
**05/22/2023**

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steppIR COMMUNICATION SYSTEMS

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|---|---|---|---|---|
| | | | | |
| | Item | Description | Qty Per | |
| | | **Antenna box** | | |
| 1 | 09-0001 | Electrical tape 3/4" PVC MERCO 307 | 1 | |
| 1 | 09-1025 | conical grinding stone, 3/4", (ENCO) | 1 | |
| 1 | 10-1013-02 | Telescoping Pole, 18 foot 4 section **(in pole box)** | 10 | |
| 1 | 10-1028-21 | TM-1 Thread Magic Anti-seize sticks | 1 | |
| 1 | 10-1054-02 | Truss Support, 30m/40m, 36" **(in pole box)** | 1 | |
| 1 | 10-1059-01 | Polyolefin Heat Shrink 1-1/2" x 3" | 30 | |
| 1 | 10-1501-23 | Cover for Black EHU, With countersunk drain hole -1 for Driven and 3 for Passives | 4 | |
| 1 | 10-1509-02 | Diverter Cone, Include DC instructions | 2 | |
| 1 | 21-6040 | Splitter, 6" 3-1/2mm, Stereo Male to Two RCA Female | 1 | |
| 1 | 60-1006-22 | QUICK DISCONNECT, 1-1/2" to 1-1/4", Fernco, (1056-150-125) | 10 | |
| 1 | 70-1007-01 | Foam plug assembly consisting of plastic cap and foam plug | 6 | |
| 1 | 70-2025-13 | CPVC tube, 49" x 3/4", with coupler **(in pole box)** | 2 | |
| 1 | 70-2025-23 | CPVC tube, 39-7/8" x 3/4", w/o coupler **(in pole box)** | 2 | |
| 1 | 70-2035 | Connector Junction Box, 4E, DB36, MIR, without 80m | 1 | |
| 1 | 70-3000-01 | 33 Volt supply with cord | 1 | |
| 1 | 70-3403-01 | EHU, 40m Driven | 1 | |
| 1 | 70-3420-01 | EHU, 20m Passive | 3 | |
| 1 | 70-6010-01 | Adapter, 25pin Dsub Field Splice | 1 | |
| 1 | 72-0009-03 | Kit, Glue | 1 | |
| 1 | 72-0054-01 | Kit, EHU Lid Hardware -1 for Driven and 3 for Passives | 4 | |
| 1 | 70-6004-01 | 4E Short 6m passive element | 1 | |
| 1 | 70-6004-11 | 4E Long 6m passive element | 1 | |
| 1 | | Electronic Controller (SDA 100 or OptimizIR) | 1 | |

| | | | | |
|---|---|---|---|---|
| | | **4E PULL SHEET CONT**<br>**Sweep box** | | |
| 2 | 10-1050-21 | Counter Weight for 4E boom, 40m dipole | 2 | |
| 2 | 10-1153-01 | Poly Sweeps (100psi) | 2 | |
| 2 | 10-1511-01 | Sweep Diverter | 4 | |
| 2 | 10-1059-21 | Polyolefin Heat Shrink 1.1” x 6” | 4 | |
| 2 | 10-1503-21 | Fiberglass rod, 3/8" x 31-3/4" long, black | 2 | |
| 2 | 72-0004-01 | Kit, 4E Boom Assy Hardware | 1 | |
| 2 | 72-0004-02 | Kit, 4E Truss Assy Hardware | 1 | |
| 2 | 72-0008-21 | Kit, 30/40m Return Hardware | 1 | |
| | | | | |
| 2 | 72-0010-31 | Kit, 55' 4 Conductor Cable and 32" Coax Seal | 1 | |
| 2 | 72-0013-01 | Kit, 4E (Short) 6m Hardware | 1 | |
| 2 | 72-0013-02 | Kit, 4E (Long) 6m Hardware | 1 | |
| 2 | 72-0018-41 | Kit, 39' Element Truss, 4E | 1 | |
| 2 | 72-0027-03 | EST Return Tube, 1-3/4" x 12", Fiberglass, (U-bolt type) with reinforcing rings | 1 | |
| 2 | 72-0030-61 | Kit, Sweep Hardware | 1 | |
| 2 | 10-1021-23 | Boom to mast Plate, 12" x.187 (4 el 2 per ant) | 2 | |
| | | **Boom box** | | |
| 3 | 70-1401-03 | Boom Assembly, 4 Element | 1 | |

| | | |
|---|---|---|
| 1 | ANTENNA BOX (61 x 13 x 10) | 75 lbs |
| 2 | SWEEP BOX (32 x 24 x 7) | 32 lbs |
| 3 | BOOM BOX (72 x 8 x 8) | 40 lbs |

# Assembly Kit Bill of Materials

## *4E Boom Assembly Hardware Kit*
## *72-0004-01*

| QTY | PART NUMBER | DESCRIPTION |
|---|---|---|
| 4 | 60-0004-21 | 2″ LONG U-BOLT WITH SADDLE |
| 2 | 60-0006 | 2-1/2″ U-BOLT WITH SADDLE |
| 2 | 60-0029 | 3″ x 1/4″ BOLT |
| 10 | 60-0030 | 1/4″ NYLOCK NUT |
| 8 | 60-0046 | 5/16″ NYLOCK NUT |
| 4 | 60-0050 | 3/8″ NYLOCK NUT |
| 4 | 60-0063 | 3-1/4″ x 1/4″ BOLT |
| 50 | 60-0041 | 1/4″ WASHER |
| 4 | 60-0100 | 3-1/2″ x 1/4″ BOLT |

## *4E Truss Assembly Hardware Kit*
## *72-0004-02*

| QTY | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 60-0004-02 | 2″ LONG U-BOLT WITH SADDLE |
| 2 | 60-0034 | 3/8 WASHER |
| 26ft | 21-8000 | 1200i PHILLYSTRAN |
| 2 | 60-0083 | 4″ SS TURNBUCKLE |
| 3 | 60-0037 | EYEBOLT |
| 1 | 60-0085 | 4″ THREADED BOLT |
| 1 | 60-0042 | 2″ FLAT PLATE |
| 4 | 60-0044 | PLASTIC END CAP |
| 16 | 60-0045 | 3/16″ WIRE CLIP |
| 7 | 60-0046 | 5/16″ NYLOCK NUT |
| 4 | 60-0048 | 3/16″ THIMBLE |
| 3 | 60-0050 | 3/8″ NYLOCK NUT |

# Assembly Kit Bill of Materials

## *4E Terminal Strip / EHU Pack*
### *72-0008-01*

| QTY | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 09-0001 | ELECTRICAL TAPE |
| 1 | 60-6000-40 | 4” HOSE CLAMP |
| 1 | 70-1102-21 | 1-1/2” ELECTRICAL ENCLOSER |
| 2 | 10-1029-01 | CONNECTOR PROTECTOR (bulb grease CP-1) |
| 2 | 20-6020-8 | 8 – POSITION CONNECTOR |
| 1 | 20-6020-1 | 1 – POSITION CONNECTOR |

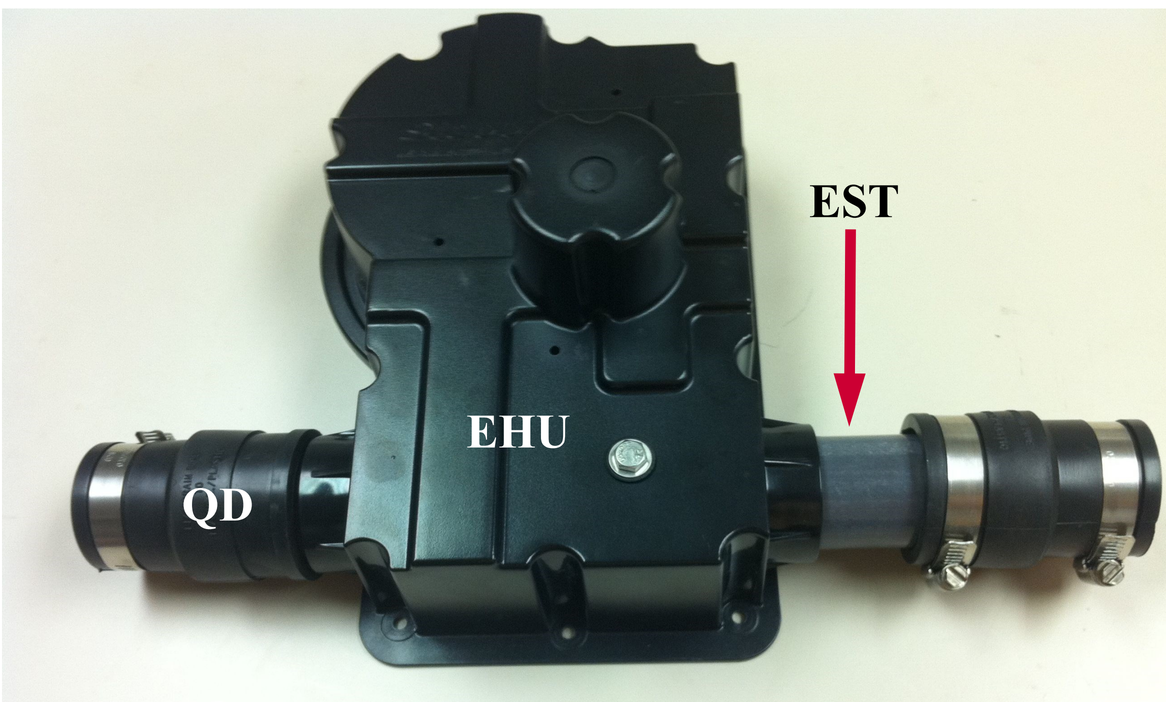
## *EHU Lid Hardware Kit*
### 72-0054-01

Note: Four of the below kits are used for the 4E Yagi

| QTY | PART NUMBER | DESCRIPTION |
|---|---|---|
| 11 | 60-0019 | 10-32 Nylock Nut |
| 2 | 60-0017-10 | 10-32 X 7/8 Flat Phillips Screw |
| 9 | 60-0061 | 10-32 X 7/8 Pan. Phillips Screw |
| 11 | 60-0018 | 10-32 Flat Washer |

# Abbreviations

| | |
|---|---|
| EST | Element Support Tube |
| EHU | Element Housing Unit |
| QD | Quick Disconnect Boot (rubber) |



# SteppIR - Why Compromise?

The SteppIR antenna was originally conceived to solve the problem of covering the six ham bands (20m, 17m, 15m, 12m, 10m and 6m) on one tower without the performance sacrifices caused by interaction between all of the required antennas.

Yagi's are available that cover 40 meters through 10 meters by using interlaced elements or traps or log periodic techniques, but do so at the expense of significant performance reduction in gain and front to back ratios. With the addition of the WARC bands on 30m, 17m and 12m, the use of interlaced elements and traps has clearly been an exercise in diminishing returns.

Obviously, an antenna that is precisely adjustable in length while in the air would solve the frequency problem, and in addition would have vastly improved performance over existing fixed length Yagi's. The ability to tune the antenna to a specific frequency, without regard for bandwidth, results in excellent gain and front to back at every frequency.

The patented folded dipole loop elements on the DB36 allow for outstanding performance on 40m and 30m with element lengths that are 40% shorter than a full sized Yagi—at the expense of only 0.3dB of gain!

The SteppIR design was made possible by the convergence of determination and high tech materials. The availability of new lightweight glass fiber composites, Teflon blended thermoplastics, high conductivity copper-beryllium and extremely reliable stepper motors has allowed the SteppIR to be a commercially feasible product.

The current and future SteppIR products should produce the most potent single tower antenna systems ever seen in Amateur Radio! We thank you for using our SteppIR antenna for your ham radio endeavors.

73 and good DX!

John Mertel

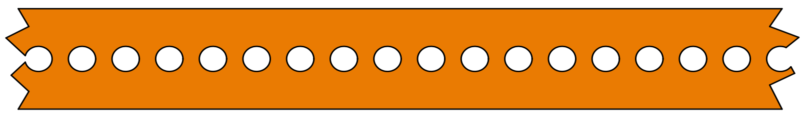
***John Mertel***
***President/CEO***
***WA7IR***

# SteppIR Design

Currently, most multi-band antennas use traps, log cells or interlaced elements as a means to cover several frequency bands. All of these methods have one thing in common–they significantly compromise performance. The SteppIR™ antenna system is our answer to the problem. Yagi antennas must be made a specific length to operate optimally on a given frequency.

So, instead of trying to "trick" the antenna into thinking it is a different length, or simply adding more elements that may destructively interact, why not just change the antenna length? Optimal performance is then possible on all frequencies with a lightweight, compact antenna. Also, since the SteppIR can control the element lengths, a long boom is not needed to achieve near optimum gain and front to back ratios on 20 - 10 meters.

Each antenna element consists of two spools of flat copper-beryllium tape conductor (.54" Wide x .008" Thick) mounted in the element housing unit. The copper-beryllium tape is perforated to allow a stepper motor to drive them simultaneously with sprockets. Stepper motors are well known for their ability to index very accurately, thus giving very precise control of each element length. In addition, the motors are brushless and provide extremely long service life.

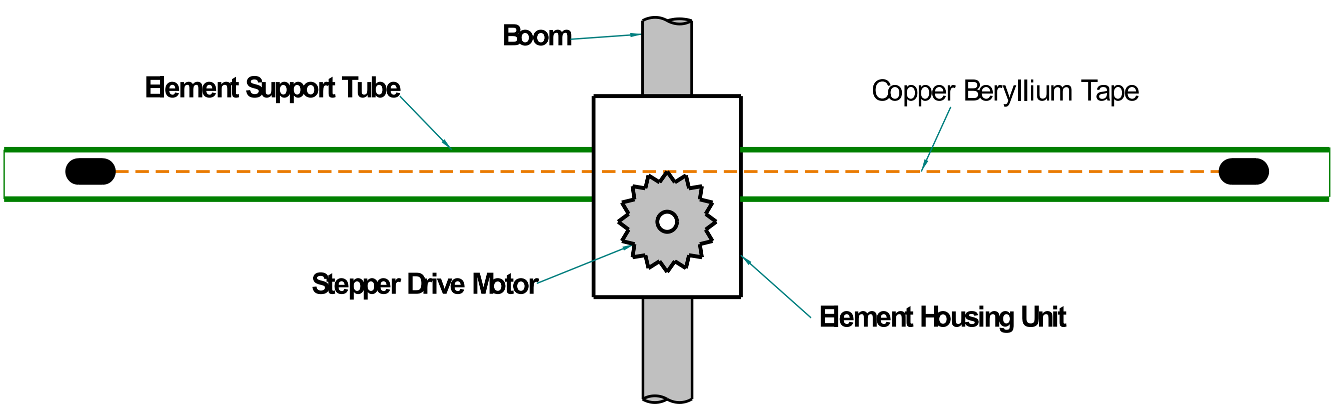


**Copper-Beryllium Tape**

The copper-beryllium tape is driven out into a hollow fiberglass elements support tube (see below), forming an element of any desired length up to the limit of each specific antenna model (a vertical uses only one side). The fiberglass elements support tubes (poles) are telescoping, lightweight and very durable. When fully collapsed, each one measures approximately 57" in length. Depending on the model, there may be additional extensions added to increase the overall element length.

The ability to completely retract the copper-beryllium antenna elements, coupled with the collapsible fiberglass poles makes the entire system easy to disassemble and transport.

The antenna is connected to a microprocessor-based controller (via 22 gauge conductor cable) that offers numerous functions including dedicated buttons for each ham band, continuous frequency selection from 80m to 6m (depending on the model). There are also 17 ham and 6 non-ham band memories and you can select a 180° direction reversal* or bi-directional* mode and it will adjust in just about 3 seconds (* yagi only).



## WORD OF CAUTION

**Be Careful to avoid making contact with power lines or other potential hazards when constructing, moving and installing the antenna, as you could be seriously injured or even killed if a metal object comes in contact with high voltage.**

## ASSEMBLING THE ANTENNA

It is highly recommended that you read these Assembly Instructions in their entirety before assembling the antenna. Doing so will provide you an overall idea of what needs to be done and helps avoid making time-consuming mistakes. At a minimum, read the directions for each step before starting it. There will be a replacement in antenna parts if there is a 40/30m adder option, refer to that manual for those changes. Building your SteppIR™ is a straightforward process. It entails:

- Building the boom
- Connecting the boom-to-mast plate to the boom using the EZeye™
- Securing the element housing units to the element-to-boom brackets
- Connecting the required wiring
- Attaching the wiring enclosure and control cable to the boom
- Preparing the fiberglass telescoping pole
- Attaching the fiberglass telescoping pole to the element housing units
- Installing the optional 6M passive elements (if ordered)
- Installing the boom truss support assembly

## Build the Boom

The boom (**Figure 1.5**) is completely assembled and drilled at the factory to assure precision element alignment. You may notice in some cases that on a given splice (**Figure 1**) the holes on each side of the splice are at 90 degrees with each other. This is as designed and **not** a mistake. Pre-drilled holes are quite snug to align almost perfectly. If the holes are visibly out of alignment when you are assembling the boom, you probably have the boom pieces put together in the wrong order - or the section of booms without an element to boom bracket may need to be rotated 180 degrees. Each boom piece has a number permanently **written**, **scribed** or **stamped** on it. Match each number with the exact same number of a corresponding boom piece. **Figure 1** shows joint # 1 markings inside the ring (they must line up). **Drawing 1** on the following page shows how each boom section is numbered.

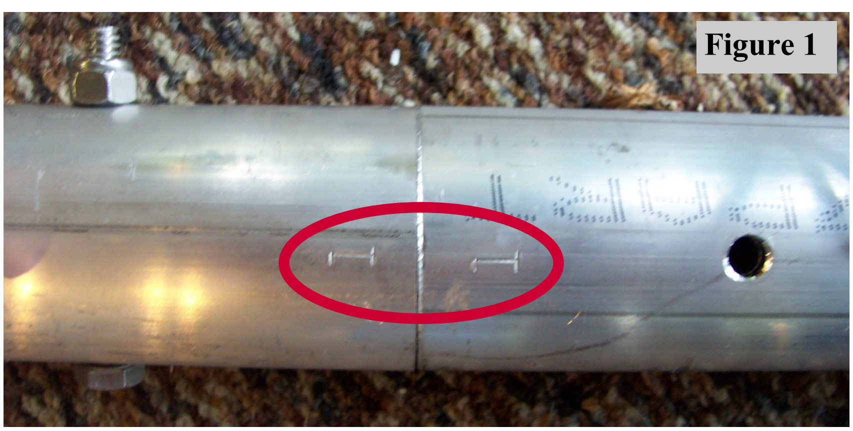
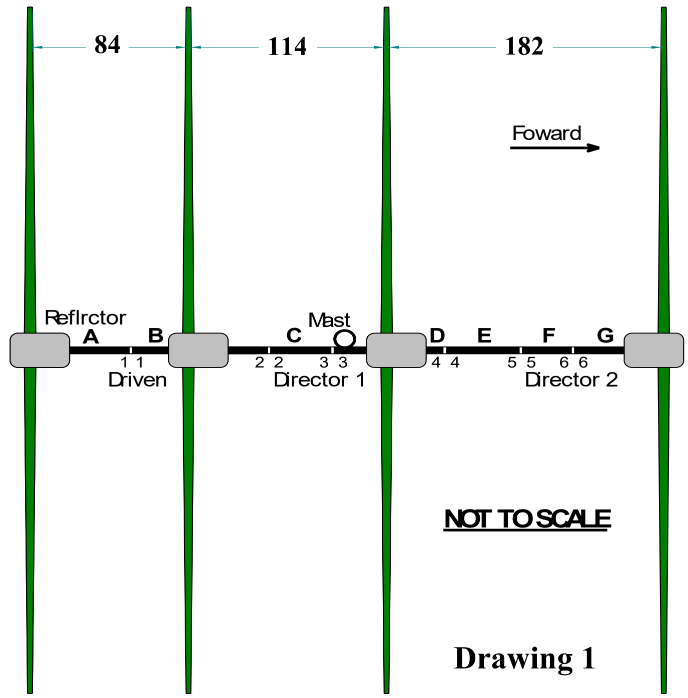


Figure 1


**Drawing 1** shows the layout of the boom for assembly. Note that the lengths shown for each boom piece are overall lengths, the actual finished length of the boom will be 32 feet. The paired numbers shown in the drawing are inscribed on each associated boom section during the manufacturing process. Matching these numbers will insure correct alignment. Refer to **Table 2** for proper bolt sizes for each respective connection.




**Drawing 1**

| Table 2: - Bolt Sizes Required for Assembling Boom | | |
|---|---|---|
| **Joint** | **Bolt Size** | **QTY** |
| 1 | 1/4-20 x 3" w / Nylok nut | 1 |
| 1* | 5/16" x 4" Eyebolt / nut | 1 |
| 2 | 1/4-20 x 3-1/4" w /Nylok nut | 2 |
| 3 | 1/4-20 x 3-1/2" w / Nylok nut | 2 |
| 4 | 1/4-20 x 3-1/2" w / Nylok nut | 2 |
| 5 | 1/4-20 x 3-1/4" w / Nylok nut | 2 |
| 6 | 1/4-20 x 3" w /Nylok nut | 1 |
| 6* | 5/16" x 4" Eyebolt / nut | 1 |

| Section | Dimensions | With Bracket |
|---|---|---|
| A | 1-3/4 x 50-3/8 | Yes |
| B | 2 x 72 | Yes |
| C | 2.25 x 48 | No |
| D | 2.5 x 72 | Yes |
| E | 2.25 x 48 | No |
| F | 2 x 72 | No |
| G | 1-3/4 x 50-3/8 | Yes |

* The second fastener at this joint is the 5/16" x 4" Eyebolt used for the truss assembly. (**Figure 3** )

Locate and position the seven sections of boom tubing, and the respective fasteners. **Rub a thin film of connector protector around the circumference of all male boom pieces <u>BEFORE</u> sliding the female sections over them (Figure 2). Also, do not twist the aluminum tubing excessively as that can cause binding.** Assemble the boom by sliding the seven sections together in the order shown on **Drawing 1** .


Figure 2

**Note:** The boom bolts need to have a total of "5" flat washers on each bolt to prevent the nut from bottoming out at the end of the threads before it is tight.

Insert the required bolts into the holes and loosely attach them with the 1/4" Nylok nuts.

**Note:** In some cases you may find it necessary to assist the bolts that you are installing by "threading' them with a wrench. Do NOT attempt to hammer them into place.

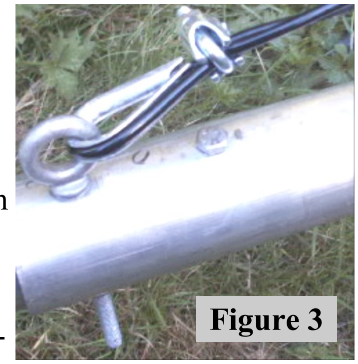


Figure 3

On the boom connections numbered 1 and 6 (see **Drawing 1**) one hole will be larger than the other. The smaller hole is for the 1/4-20 x 2.50" bolt and Nylok nut, the larger hole is for the 5/16" eyebolt that holds each end of the Pillystran Kevlar™ truss material in place (**Figure 3**). There is also a hole for a third 5/16" x 4" eyebolt (used for the EZeye™ feature explained later) located at the center point of the boom. Install this eyebolt with the nut and lock washer as shown in **Figure 4**.

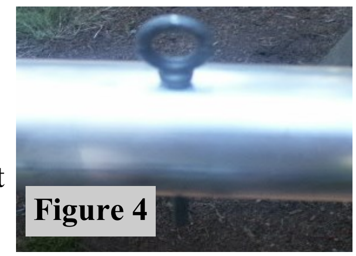


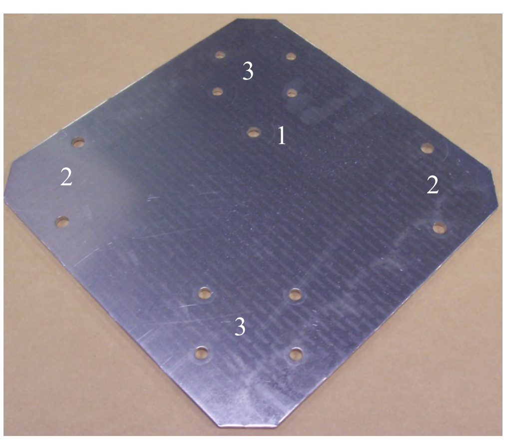
Figure 4

Now tighten the nuts on each bolt and eyebolt securely. Before continuing to the next step verify that **<u>all</u>** nuts and bolts, <u>including</u> those installed at the factory, are securely tightened.

## Connect the Boom-to-Mast Plate to the Boom

We are showing you this step now, even though in all likelihood this may be one of the last steps, as you raise the finished antenna up to the tower. It is a good idea to use the mast plate and a temporary mast as a means of supporting the antenna while assembling the elements, and to familiarize yourself with the EZeye™ adjustment system before you are up on the tower!

The mast plate consists of two identical pieces, each 11.5" x 11.5" x 3/16" thick. The mast plate has 13 pre-drilled holes (**Figure 4.5**). The 2" mast holes are used to secure the antenna to the mast on your tower. The 2-1/2" boom holes are used for attaching the boom to the mast plate. The EZeye™ hole will be explained later in this section.




1) EZeye™ – 1 Hole .402 dia.
2) 2 1/2" Boom – 4 Holes .402 dia.
3) 2" Mast – 8 Holes .344 dia.

Locate:

- Two boom-to-mast plates (**Figure 5**)
- One 3/8 x 4” fully threaded bolt (EZeye™ bolt)
- Three 3/8 x 16x Nylok nut
- Two 3/8 flat washer
- Four 2” U-bolts with saddles & Nylok nuts
- Two 2 1/2” U-bolts with saddles & Nylok nuts

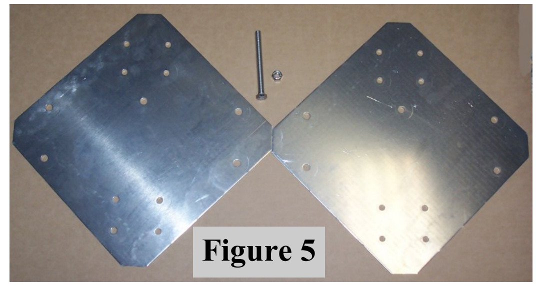


Figure 5

Insert the 3/8 x 16 x 4” fully threaded bolt through the EZeye™ hole in both mast plates, add nut then tighten (**Figure 6**), be sure that all the remaining holes are lined up with each other. Attach the mast plate to the mast (or temporary mast) using the four 2” U-bolts with saddles and nuts. Tighten securely (**Figure 7**). Thread another 3/8” nut onto the EZeye™ bolt and add a 3/8” flat washer. This represents the first part of the EZeye™ adjustment system.

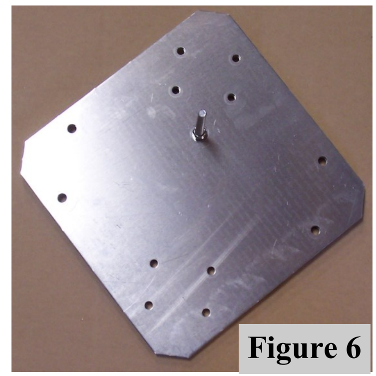


Figure 6

Lift the boom so that the eyebolt in the middle rests on top of the EZeye™ threaded bolt (**Figure 8**). This bolt can support the full weight of the antenna. The mast plates in figures 7 - 10 have a different look than what you are actually given.

**Note:** If you are doing this on the tower leave the safety rope or cable in place until you have secured the boom in place with the U-bolts.

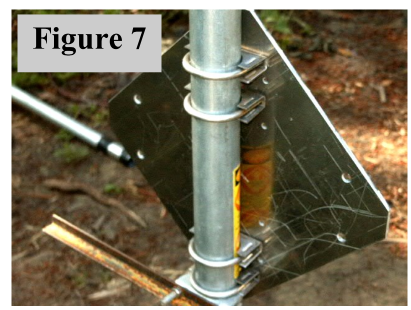


Figure 7

Place another 3/8” flat washer after the eyebolt and then another 3/8” nut. Attach the 2-1/2” U-bolts, saddles and nuts loosely, and then use two wrenches to “level” the elements as shown **Figure 9**. When finished, securely tighten the nuts on both U-bolts and EZeye™ (**Figure 10**).

The EZeye™ adjustment system also helps prevents vertical movement of the elements in the event of high winds!

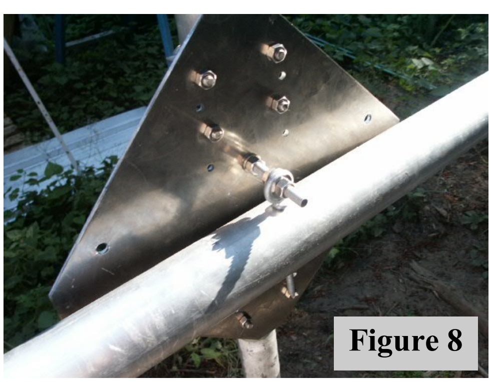


Figure 8


Figure 9

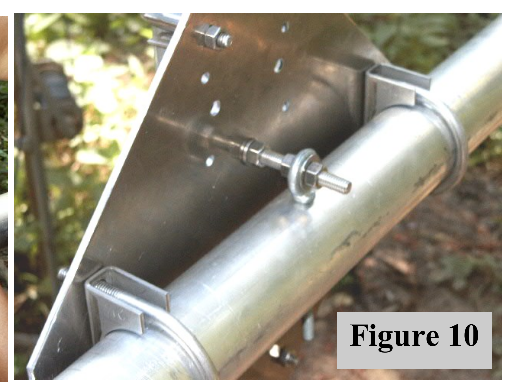
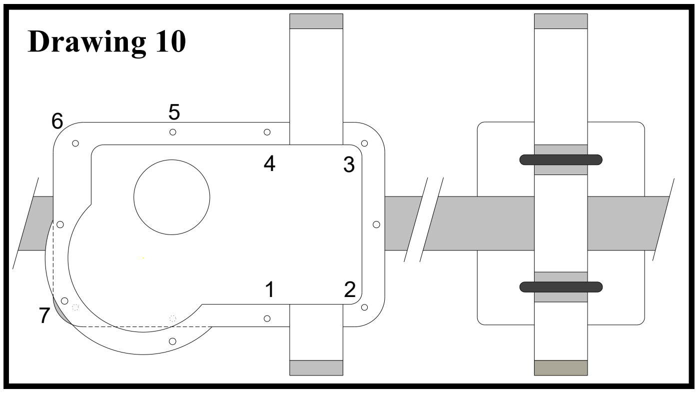


Figure 10

# Install Boom Counter-weights:
**(4 Element ONLY)**




On the 4 element antenna ONLY you will need to install a pair of counter-weights to the side of the **Director 2** element mounting bracket to balance the boom after the installation of the 40m - 30m dipole kit. These are powder coated steel bars weighing approximately a total of 8.2 pounds.

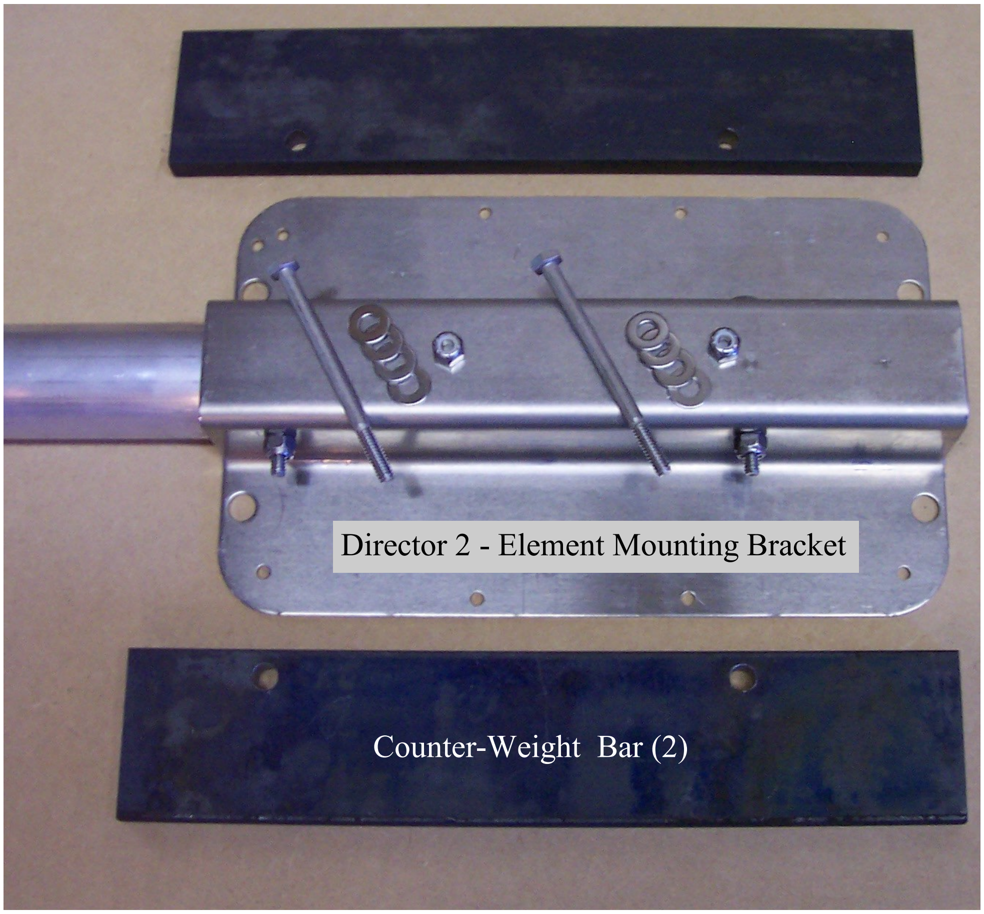
Locate:

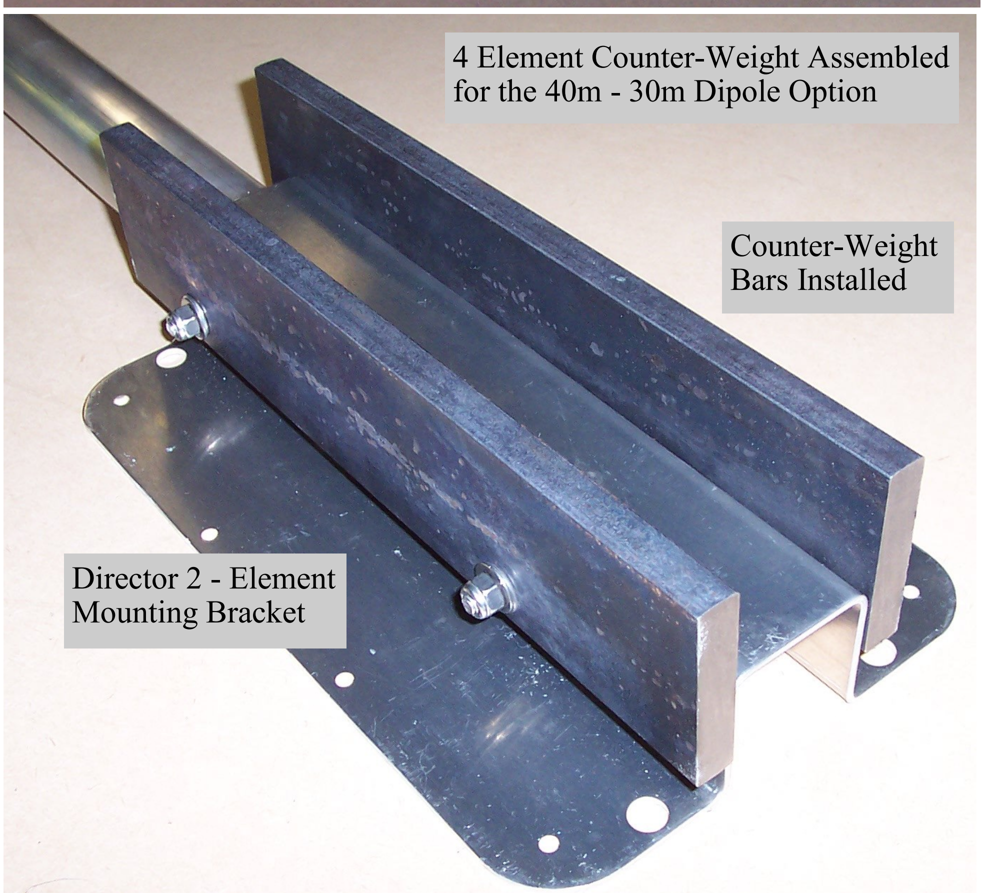
- Two steel bars 2-1/2" x 12" x 1/2" (counter-weights)
- Two 1/4-20 x 3-3/4" bolts
- Two 1/4-20 Nylok nuts
- Eight 1/4" flat washers

Suggested Installation Steps (retrofit only):

- On a retrofit installation you should not need to remove the element housing unit (EHU) from the element mounting bracket but do be careful with the weight of the EHU and the FTP's attached when you remove the existing bolts.
- Remove the first 1/4" bolt from the **Director 2** element mounting bracket and install it back into its hole from the other side of the bracket. This will support the bracket while you remove the second bolt.
- Remove the second 1/4" bolts from the **Director 2** element mounting bracket.
- Put two 1\4" flat washers on each of the new 1/4-20 x 3-3/4" bolts.
- Position the first counter-weight by lining up the holes so that the end of the weight is even with the end of the element mounting bracket and install a new 1/4-20 x 3-3/4" bolts with the two flat washers through the empty hole.
- Now install the second new 1/4-20 x 3-3/4" bolts with the two flat washers through the second hole pushing out the old bolt that you temporarily installed from the other side.
- Put the second counter-weight over the two new bolts sticking out.
- Install two flat washers on each bolt and then the new Nylok nuts and tighten.
- This completes the installation of the counter-weights.

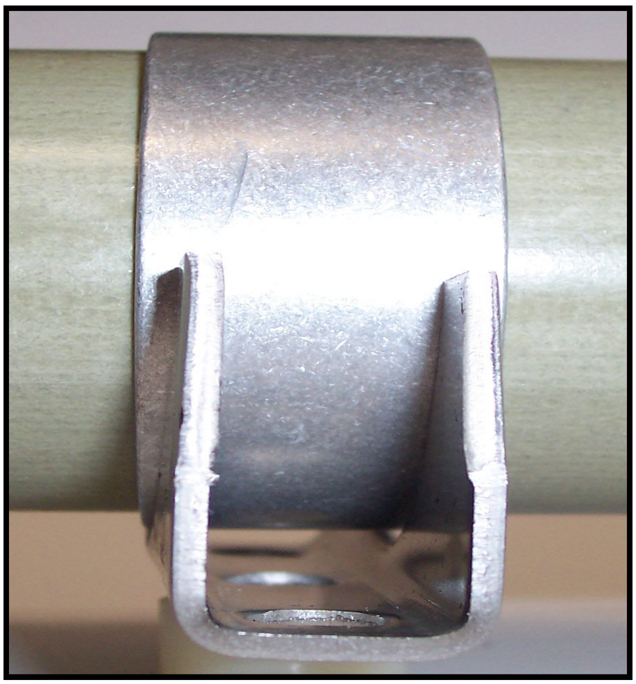
## Install Boom Counter-weights (4 Element cont.)

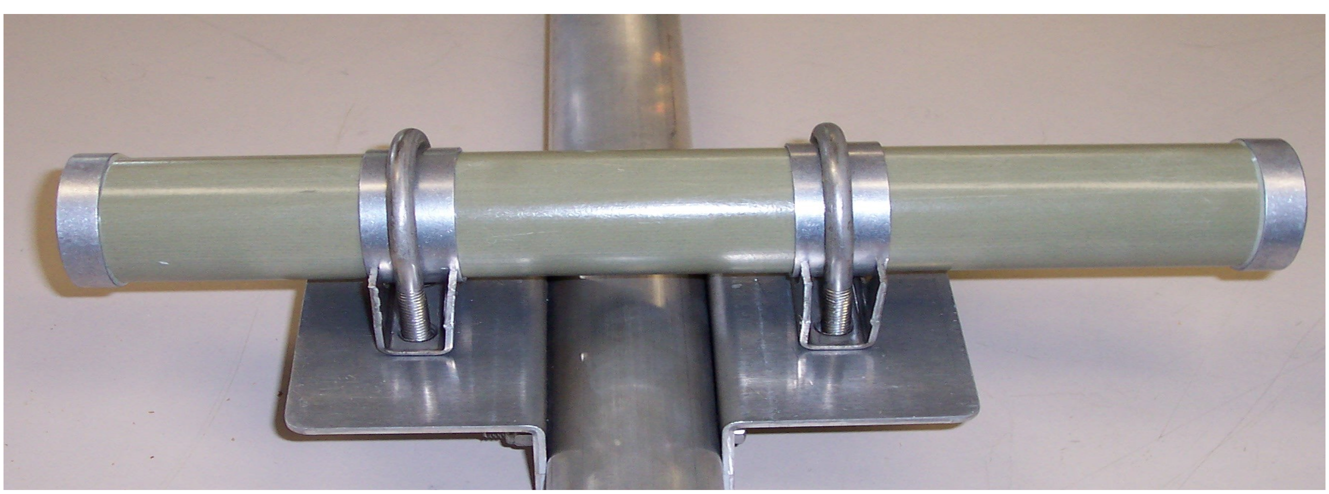


**<u>Assemble the Return Mounting Kit</u>**

- Install return element cross tube and U-bolts as seen in below picture (center an aluminum sleeve under each U-bolt but do not tighten yet).
- Measure the return tube offset to match the offset of the driven element housing tube (see drawing on prior page)
- Tighten the U-bolts securely.





steppIR
COMMUNICATION SYSTEMS

| Connector Box Option | | | |
|---|---|---|---|
| **Item** | **QTY** | **Part #** | **Description** |
| | 1 | 10-1615-01 | Connector box assembly with lid and connector board |
| | 4 | 60-0022 | 4 X 4-4 SS nylock nut |
| | 1 | 10-1053-02 | Connector box aluminum mounting plate |
| | 1 | 10-1260-3 | Connector board with connector and 4-40 screws with standoffs |
| | 1 | 10-1029-01 | Connector protector |
| **Truss Option Assembly Procedure** | | | |

1. Inventory all the parts for your new Connector Box Option kit.

2. Retract all elements to the home position.

3. Turn the controller power off and unplug power cable and control cable.

4. Your new Connector Box Option was designed to be attached to your antenna without having to take your antenna off your tower.

5. You will need to remove your current terminal housing and terminal strip. Make sure that you label what wires go to what element housing (i.e., DVR, REF, DIR...) This is critical before rewiring your antenna so that you don't have to take your antenna off the tower and trace what wire is for what Element Housing Unit. (EHU)

6. Unscrew terminal housing cap, so that you can expose the terminal strip that is inside. Pull out the terminal strip with wires.

7. At this point you can loosen the hose clamp and remove both the terminal housing and the hose clamp. These will not be needed with the new Connector Box.

8. This new Connector Box Option is designed to be mounted on the mast plate of your antenna so you should not need to lengthen your EHU wires, if your old terminal housing was mounted in the same general area. If it was mounted in another area and you trimmed your wires to fit you will need to either splice your wires to make them longer so they can reach the mast plate or purchase mounting saddles that allows you to mount the connector box in a verity of locations depending on antenna.

9. Mount the Connector Box Mounting Plate to the Connector Box then mount the assembly to the mast plate.

10. Use the existing hardware form your mast plate to attach the Connector Box Mounting Plate. See corresponding figure that applies to your antenna.

**CAUTION**

**WIRING YOUR ANTENNA IS VERY CRITICAL FOR CORRECT OPERATION OF YOUR ANTENNA**

**CAUTION**

11. Apply a small amount of connector protector to each wire before securing to your new Connector Box.

12. Unscrew the old terminals for each wire of your antenna. To avoid confusion during wiring it may be simplest to go one EHU at a time. Simply unplug the correct connector from the connector box board and wire it to the corresponding EHU wires. (Example DVR wires would go to DVR connector plug) The connectors may be snug but just simply pull straight up. They can only be plugged in one way so be sure to follow the wiring diagram for correct wiring. Repeat this process for the rest of your EHU's and control cable.

13. Choose the wiring diagram that applies to your specific antenna. They will vary depending on what antenna and what options you have for your antenna.

**REFER TO THE CORRECT WIRING DIAGRAM FOR YOUR SPECFIC ANTENNA**

14. Locate the correct figure that applies to your antenna for mounting your new Connector Box.

15. To assemble your Connector Box make sure that the board is seated completely inside the connector box housing. There should be 4 X 4-40 screws sticking out of the bottom of the connector housing. It is important that the board be mounted in the correct direction inside the housing. See thecorresponding figure that applies to your antenna for correct board assembly.

16. Place the connector box housing onto the mounting plate so that the tear away holes are facing down. Tighten the 4 X 4-40 nuts to the screws so that the Connector Box is mounted in the correctorientation.

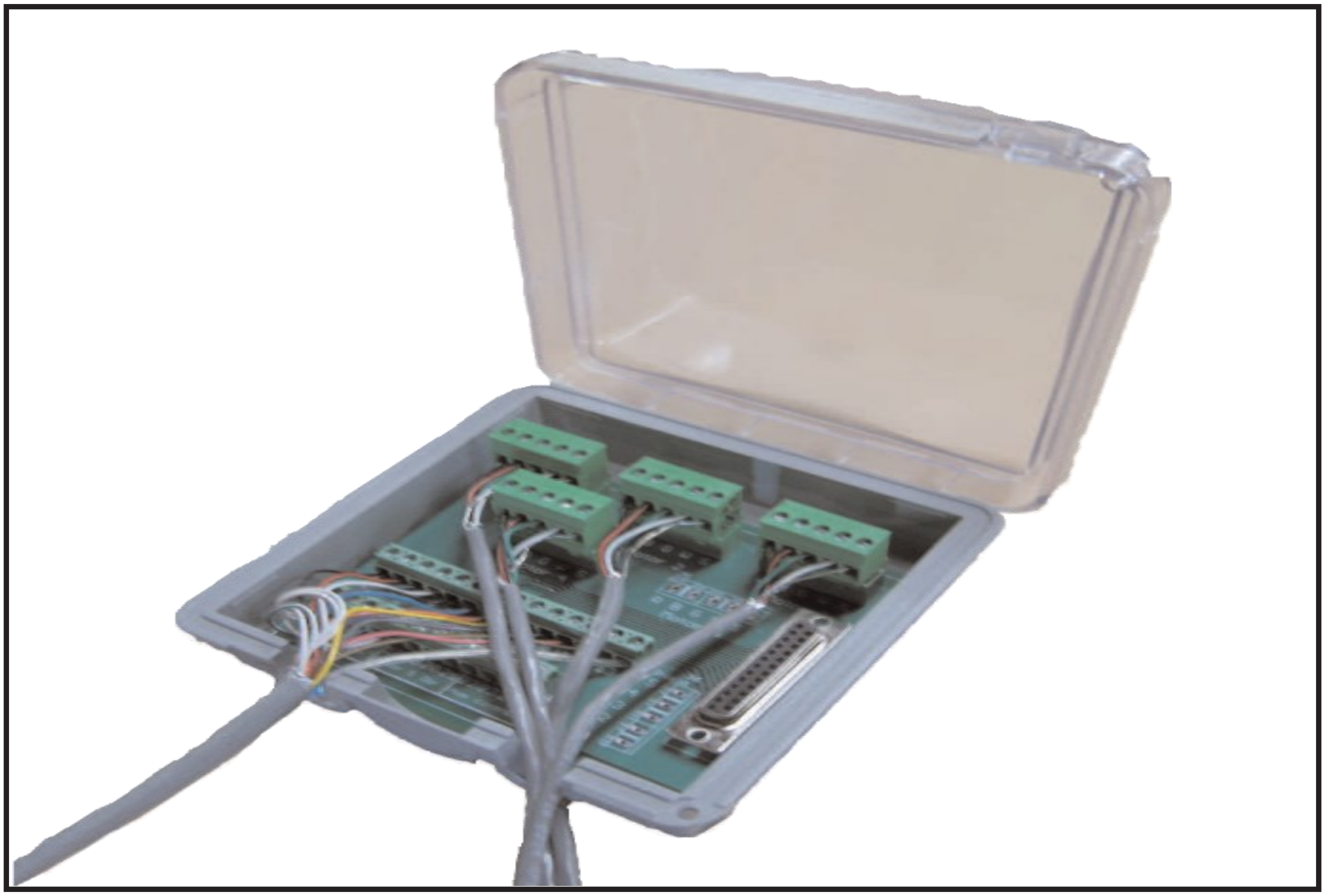
17. Plug the correct connector into their respective sockets and tear away one of the three holes in the connector box. Run all your wires through the one torn out hole in the connector box.

18. **DO NOT** seal around the wires. This channel is intentionally left open to allow any condensation collecting in the box to escape. Relieve strain from your cables by putting a zip tie on the inside of the box to prevent the cables from pulling out.

19. Use dielectric grease (included in the box) to protect each bare conductor. Apply the grease to the plug/header connection as well.

20. Perform a test motor function on your antenna to ensure that wiring has been performed correctly. Refer to your antenna manual and operations manual for test motor function procedures.

21. Last step is to secure the lid of the connector box onto the housing of your new connectorbox. If everything has been installed correctly then the lid should close shut in a downward motion.Just simply click it shut and your assembly is complete. We recommend using a small zip tie through the latch to keep it permanently closed.



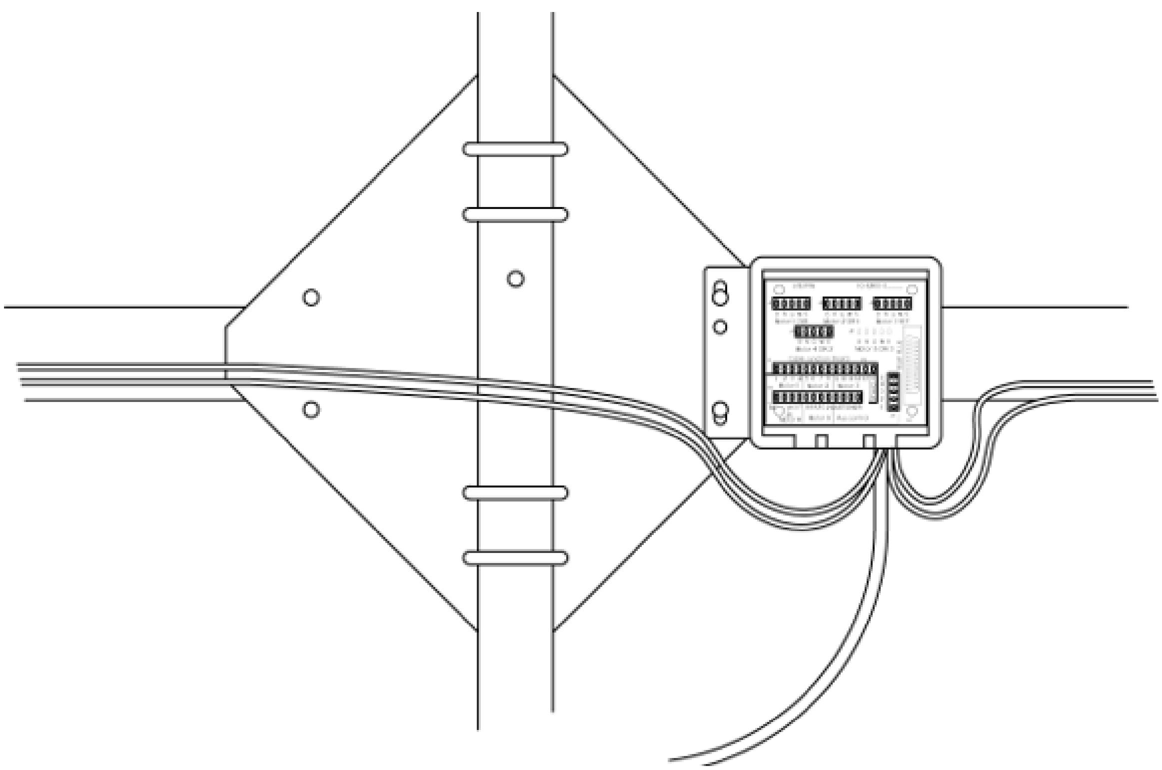
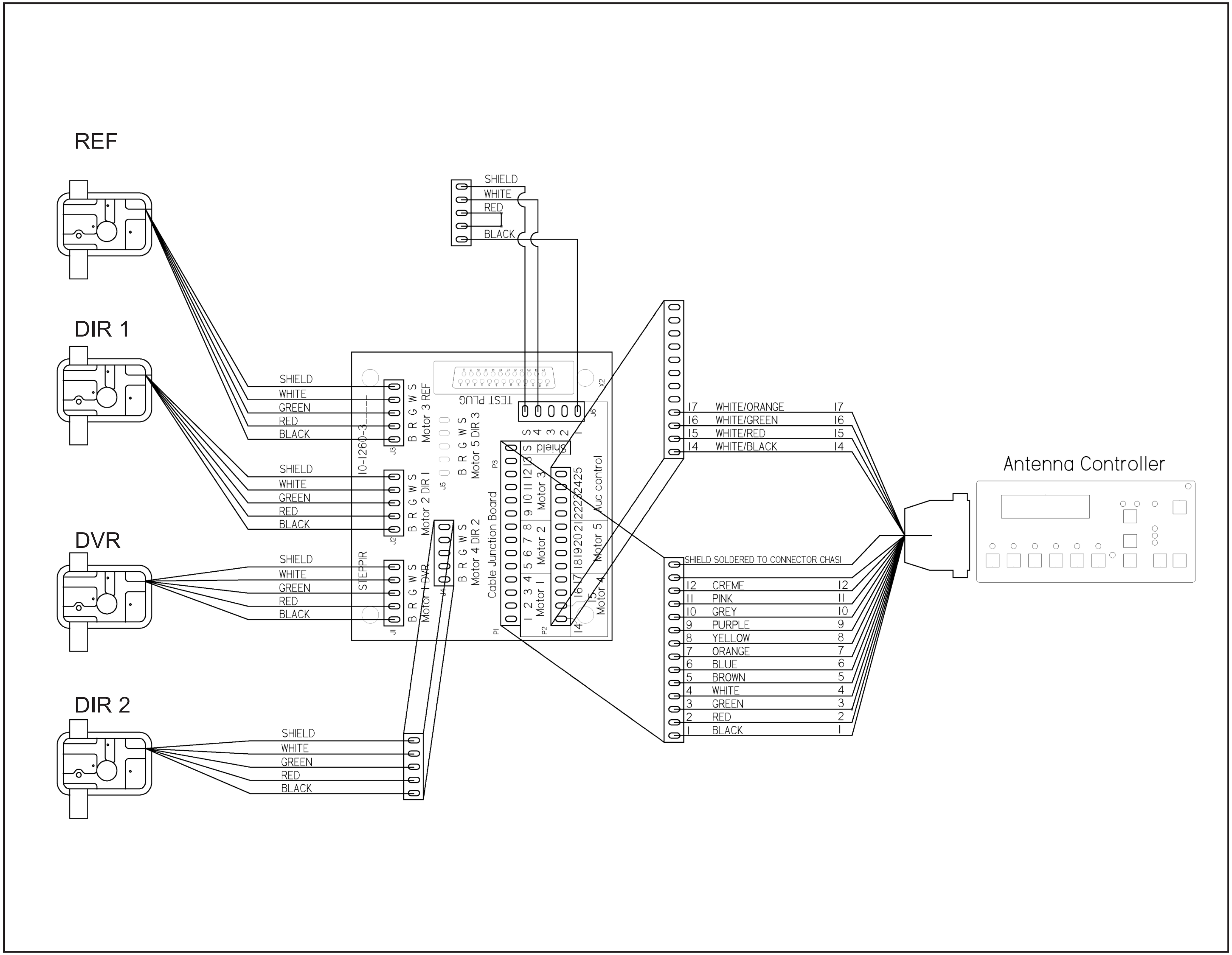


**Figure 4** **4 Element Wiring Diagram**

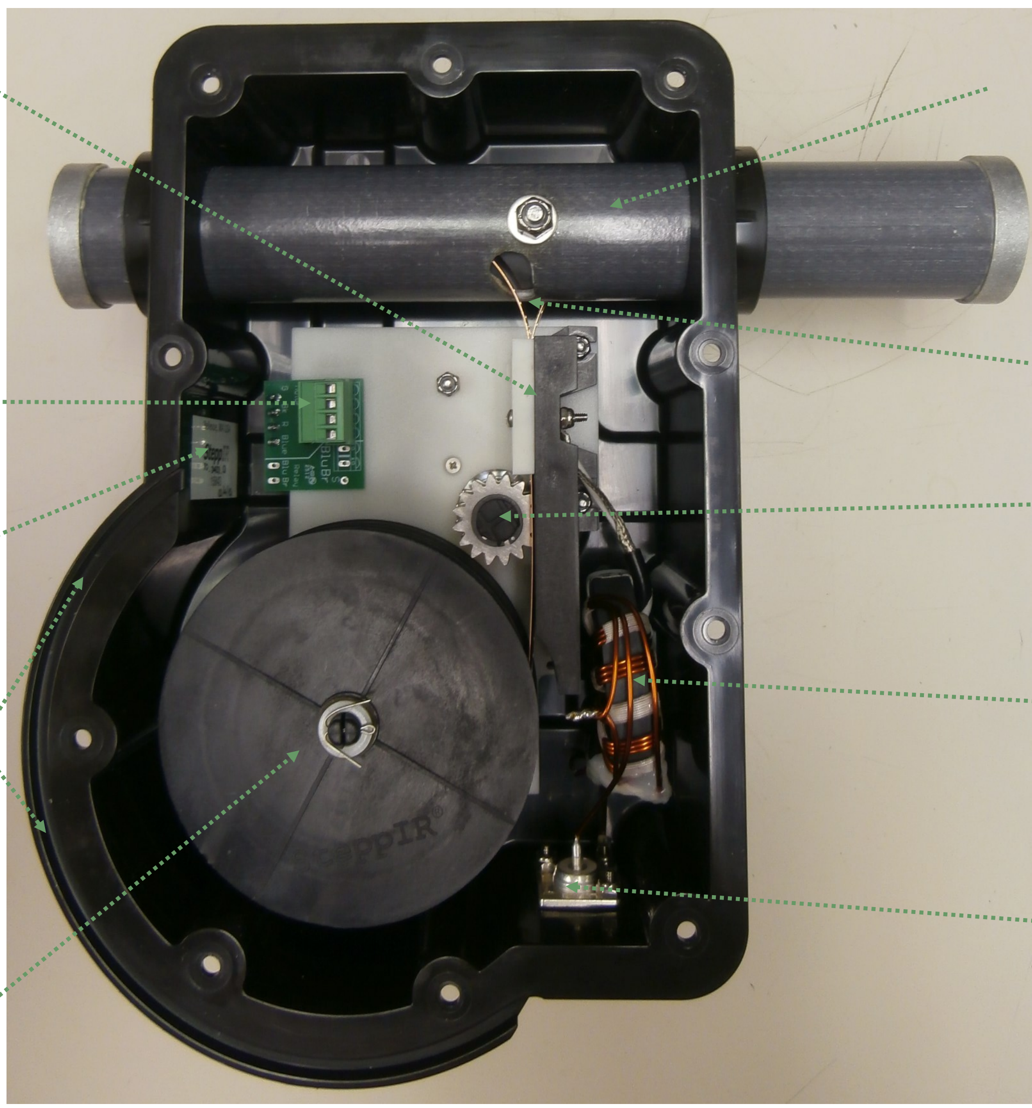


# ELEMENT HOUSING UNIT (EHU) WIRING OVERVIEW

Figure 8 gives an overview of the inside of a SteppIR EHU. Wiring of each EHU will be covered in detail on the following pages.

**NEVER ATTEMPT ANY WIRING WHILE THE ELECTRONIC CONTROLLER IS CONNECTED TO THE CONTROL CABLE.** Even if the power is turned off of the controller, damage can occur. This is the number one cause of antenna installation failures, so please be sure to heed the advice.

**FIGURE 8**



# EHU WIRING

Trim approximately 1.5 inches of the outer jacket of the control cable (4 wire). Remove the shield material, the support thread and cut the ground wire off as shown in figure 9. Attach electrical tape at the end of the trimmed control cable jacket so that there is no chance for a short. Remove 0.25 inches of the insulation from each of the individual 22 AWG wires, leaving bare copper. Tinning of the copper wire ends with solder is not required but may be helpful in keeping the ends together while attaching the control cable wires. Figure 10 shows the control cable should look like when you are finished with the trimming. Dip each of the copper wires into connector protector before inserting into the terminal plug. Figure 11 shows what the connector protector will look like.

The terminal header assembly consists of the terminal header and the terminal plug as shown in figure 8. The plug is shipped loosely attached to the header. Remove this plug when wiring and firmly plug back in when completed. Follow the wire sequence in figure 13 for each EHU. *Be careful to ensure that there are no bare wires protruding out from the terminal clamps, to avoid potential shorts.*

The wiring sequence for each EHU is also imprinted on the PCB that the terminal header is mounted on (located inside the EHU). Pay no attention to the second row of imprinted text, these pins are for use in the manufacturing of the board itself and are of no use to you. Figure 12 shows a blue line crossing out the text in question. The yellow circle shows the correct wiring sequence.

**FIG. 9**

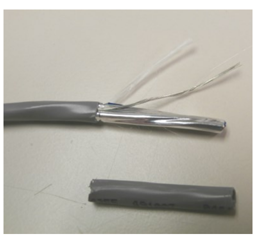


**FIG. 10**

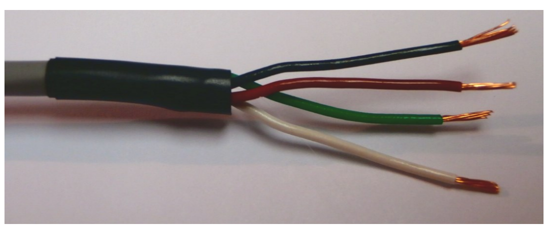
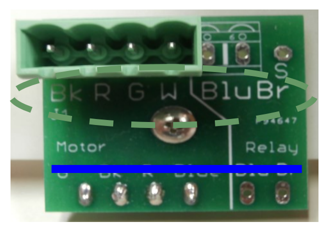


**FIG. 11**

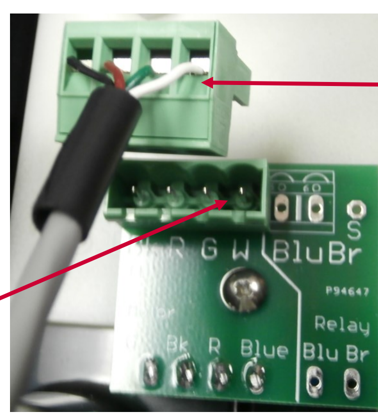

**FIG. 12**




**4 Pin Header Wiring Sequence**

| BLACK | RED | GREEN | WHITE |
|---|---|---|---|

**FIG. 13**



# EHU WIRING (continued)

Check to be sure the terminal plug is firmly inserted into the terminal header.

Lay the control cable wire inside the wire tray of the EHU as shown in figure 14. This trough acts as a strain relief so that the cable will not be pulled out of the EHU. It is a good idea to leave a small amount of slack between the plug and the point which the tray starts as shown in figure 15.

Using the coax seal and cut into 1 inch strips as shown in figure 16. You will need three strips. The remainder can be used to seal the driven element SO239 connectors, should you wish to.

Apply coax seal on top of the control cable and work it around the cable and on top of the cable tray as shown in figure 17. This will help keep water from entering into the EHU. Apply the coax seal to the 2 remaining sections of the wire tray as shown in figure 18.

Repeat wiring and coax seal preparation for each EHU. When finished, the EHU's will be secured to the aluminum element mounting plates. This is covered in detail in the next chapter.

**FIG. 14**

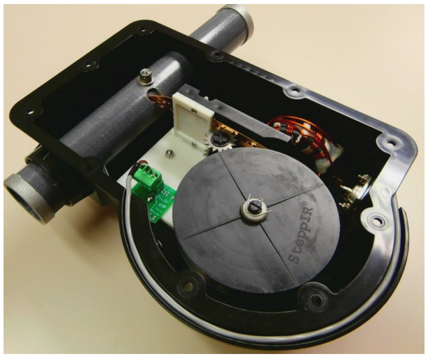


**FIG. 15**

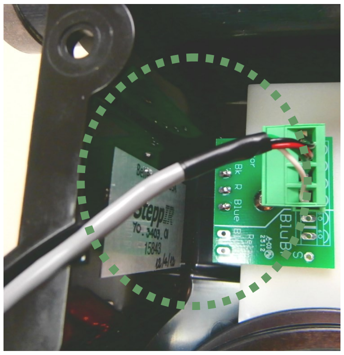


**FIG. 16**

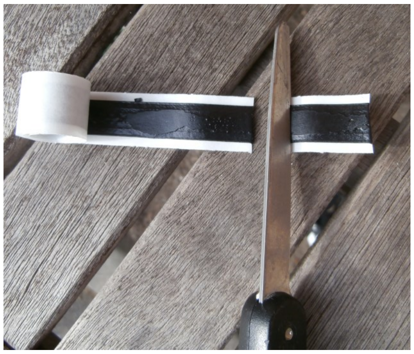


**FIG. 17**

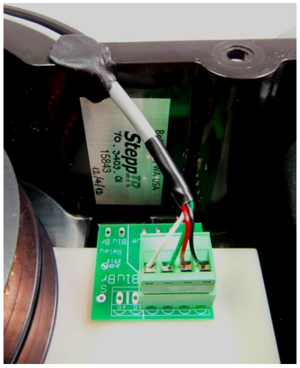
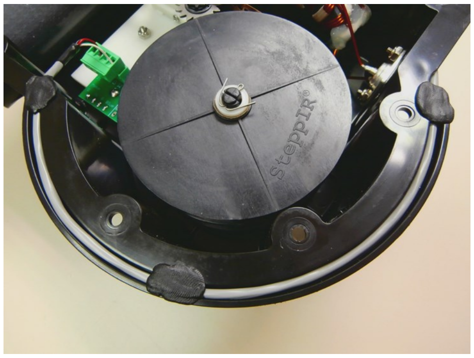


**FIG. 18**



# EHU WIRING (continued)

## PREPARING THE CONTROL CABLE

1. Strip the jacket and aluminum shielding off of the control cable as shown in figure 5.20, approximately 2.75″ from end of control cable, being careful not to damage the individual wires.
2. Strip the plastic insulation off of each of the control cable wires, approximately 0.25″ in length should be bare wire.

## CONNECTING CONTROL CABLE TO THE DB25 SOLDERED CONNECTOR

If you purchased the default DB25 connector, follow the steps below to connect it to your control cable. If you purchased the optional DB25 Field Splice upgrade, skip ahead to the next section.

1. Solder each wire to the appropriate pin of the 25 pin connector. Refer to the table on the following page for the correct wiring sequence.
2. Attach the clamp to the control cable approximately 1″ from the connector and secure with the provided hardware as shown in figure 5.21.
3. Place the connector between the back-shell halves as shown in figure 5.22 and secure with the provided hardware.

## CONNECTING CONTROL CABLE TO THE OPTIONAL DB25 FIELD SPLICE

The optional DB25 Field replaces the standard connector with a convenient solder-less connection of the control cable to the SteppIR controller. If you purchased this option, follow the steps below to connect it to your control cable.

1. Apply the provided dielectric grease to the exposed copper portion of each wire.
2. Connect each wire to the appropriate terminal and tighten using a flat head screwdriver. Note that the terminals may be closed by default. If so, turn the terminal screw ccw ~10 turns to open it before inserting the wires. Consult the table on the next page for the correct wiring sequence.
3. Position the control cable between the cable clamp halves as shown in figure 5.23.
4. Tighten the two pan head screws until the cable is snug, but do not over-tighten.
5. Thread the two thumb screws into the connector face as shown in figure 5.23.
6. Plug the DB25 splice into the back of the controller and twist the thumb-screws to secure it.

**FIG. 5.20**

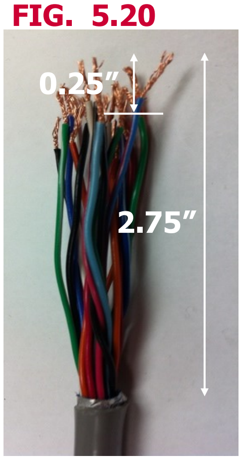



**FIG. 5.21**

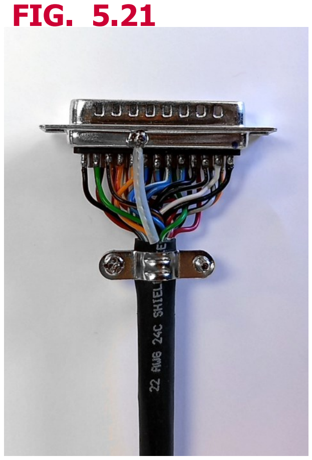


**FIG. 5.22**

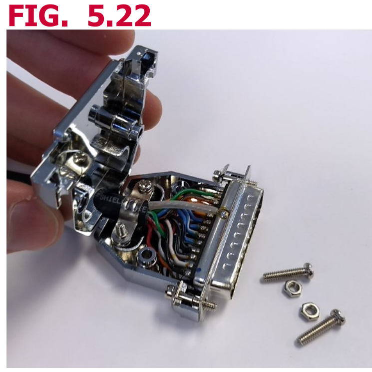


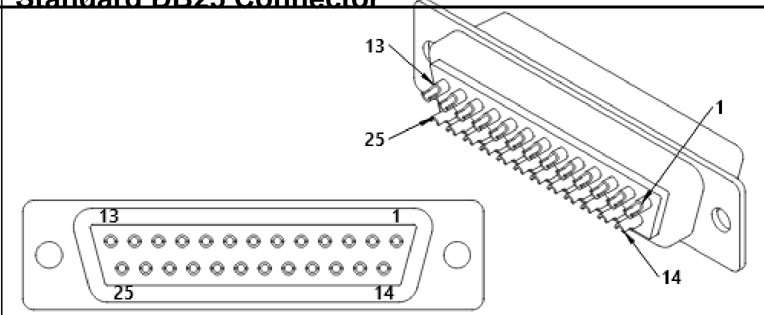
**FIG. 5.23**

## CONNECTING CONTROL CABLE TO THE DB25 FIELD SPLICE

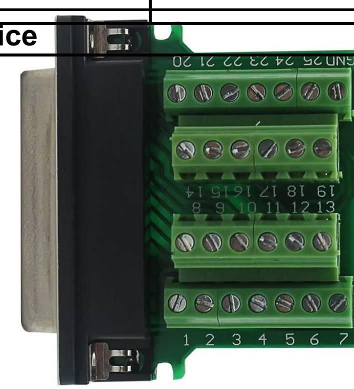
| Pin | DB42 (24 Conductor) | DB36 (w/80m) (24 Conductor) | 4E, DB36 (No 80m) (16 Conductor) | DB11, DB18/18E (16 Conductor) | 2E, 3E (12 Conductor) | BigIR, SmallIR, Dipole | |
|---|---|---|---|---|---|---|---|
| 1 | BLACK | BLACK | BLACK | BLACK | BLACK | BLACK | |
| 2 | WHITE | WHITE | RED | RED | BROWN | RED | |
| 3 | WHITE/BLACK STRIPE | WHITE/BLACK STRIPE | GREEN | GREEN | RED | GREEN | |
| 4 | BLACK/WHITE STRIPE | BLACK/WHITE STRIPE | WHITE | WHITE | ORANGE | WHITE | |
| 5 | BLUE | BLUE | BROWN | BROWN | YELLOW | BLACK | w/Coil |
| 6 | BLUE/WHITE STRIPE | BLUE/WHITE STRIPE | BLUE | BLUE | GREEN | RED | |
| 7 | BLUE/RED STRIPE | BLUE/RED STRIPE | ORANGE | ORANGE | BLUE | GREEN | |
| 8 | BLUE/BLACK STRIPE | BLUE/BLACK STRIPE | YELLOW | YELLOW | VIOLET | WHITE | |
| 9 | ORANGE | ORANGE | VIOLET | VIOLET | GREY | | |
| 10 | ORANGE/RED STRIPE | ORANGE/RED STRIPE | GREY | GREY | WHITE | | |
| 11 | ORANGE/BLACK STRIPE | ORANGE/BLACK STRIPE | PINK | PINK | PINK | | |
| 12 | GREEN | GREEN | CREME | CREME | CREME | | |
| 13 | BLACK/RED STRIPE | BLACK/RED STRIPE | | WHITE/ORANGE STRIPE | | | |
| 14 | ORANGE/GREEN STRIPE | GREEN/WHITE STRIPE | WHITE/BLACK STRIPE | | | | |
| 15 | WHITE/BLACK-RED | GREEN/BLACK STRIPE | WHITE/RED STRIPE | | | | |
| 16 | RED/BLACK-WHITE | RED | WHITE/GREEN STRIPE | | | | |
| 17 | BLACK/WHITE-RED | RED/WHITE STRIPE | WHITE/ORANGE STRIPE | | | | |
| 18 | GREEN/WHITE STRIPE | RED/BLACK STRIPE | | | | | |
| 19 | GREEN/BLACK STRIPE | RED/GREEN STRIPE | | | | | |
| 20 | RED | | | | | | |
| 21 | RED/WHITE STRIPE | | | | | | |
| 22 | WHITE/RED STRIPE | WHITE/RED STRIPE | | WHITE/RED STRIPE | | | |
| 23 | RED/BLACK STRIPE | | | WHITE/BLACK STRIPE | | | |
| 24 | RED/GREEN STRIPE | | | WHITE/GREEN STRIPE | | | |

Twist, insert, and connect the unshielded drain wire of the control cable to the “G” pins on the optional Field Splice Connector.

Standard DB25 Connector




DB25 Field Splice



# WIRING THE CONNECTOR JUNCTION BOX (continued)

## CONNECTING CONTROL CABLE TO DB25 FIELD SPLICE (continued)

**FIG. 5.27**

| 25 PIN DSUB FIELD SPLICE TERMINAL STRIPS (3) | 16 WIRE CONTROL CABLE |
|---|---|
| 1 | BLACK |
| 2 | RED |
| 3 | GREEN |
| 4 | WHITE |
| 5 | BROWN |
| 6 | BLUE |
| 7 | ORANGE |
| 8 | YELLOW |
| 9 | VIOLET |
| 10 | GREY |
| 11 | PINK |
| 12 | CRÈME |
| 13 | WHITE/ORANGE STRIPE |
| 14 | NOT USED |
| 15 | NOT USED |
| 16 | NOT USED |
| 17 | NOT USED |
| 18 | NOT USED |
| 19 | NOT USED |
| 20 | NOT USED |
| 21 | NOT USED |
| 22 | WHITE/RED STRIPE |
| 23 | WHITE/BLACK STRIPE |
| 24 | WHITE/GREEN STRIPE |
| 25 | NOT USED |
| G | SHIELD WIRE |

**Note:** If you are wiring the control cable yourself using a 25 pin connector and backshell instead of using the above dSub field splice, use the same pin numbers shown above. For the 25 pin connector installation, you would solder the ground wire to the case of the 25 pin connector and then put the backshell on.

Attaching the NEW EHU to the boom is a two step procedure. The first step involves attaching the lid and gasket with the 3 screws show in Figure 2. The second step is to attach the EHU to the element place on the boom with the remaining 7 screws as shown in figure 3.

**WARNING:**

When assembling the lid to the housing and the housing to the boom make sure the control cable is not being pinched or damaged in any way. This can cause a short and will drastically effect the performance of the antenna.

**Figure 2** **Lid Assembly**

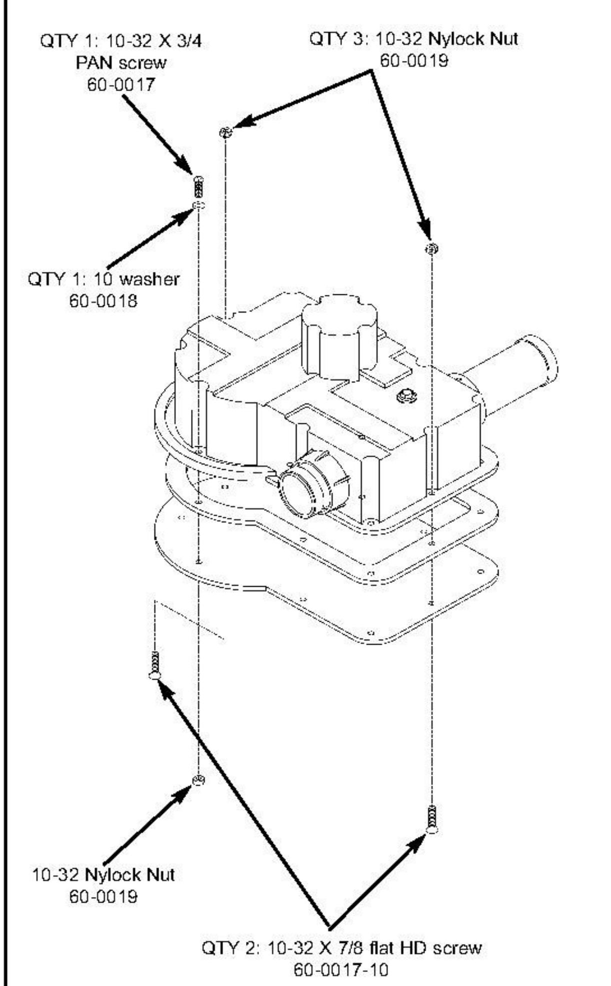
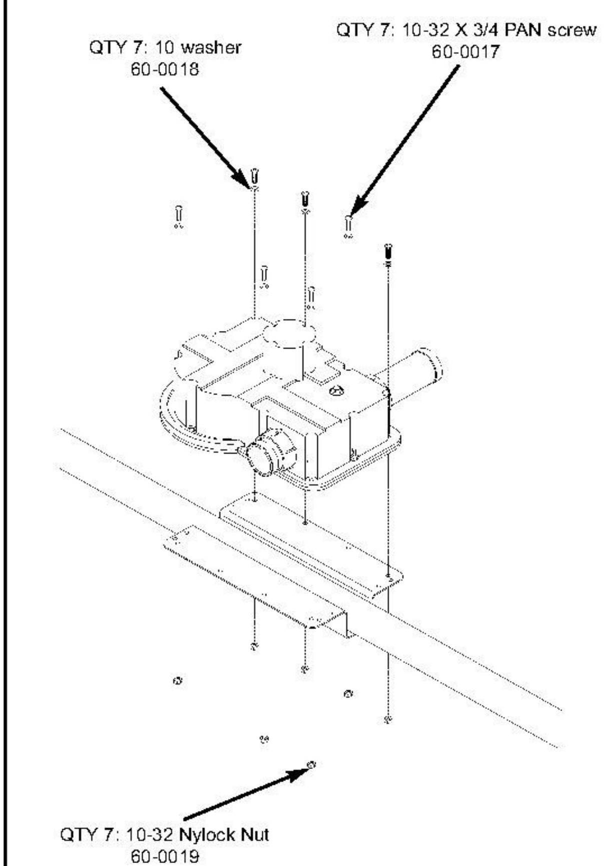
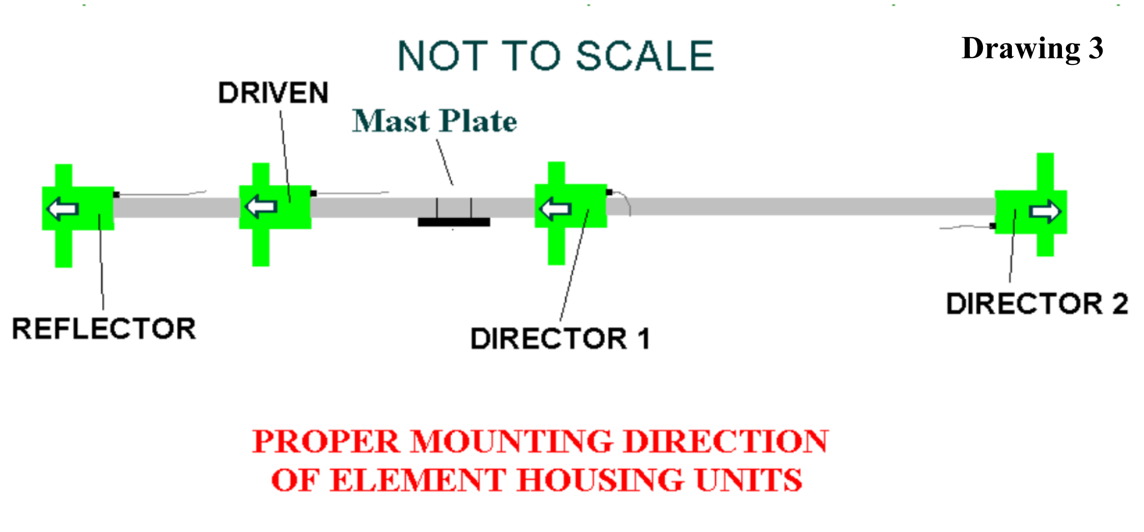



**Figure 3** **EHU Assembly**




**NOTE:**
Orientation of the EHU and the style of the element mounting bracket shown here may not be for your specific antenna model. Follow antenna assembly manual for correct EHU orientation.

Proper EHU orientation is critical to operation of the antenna. Make sure they are installed on top of the element-to-boom brackets exactly as shown in Drawing 3 (looking down on the boom).




Refer to **Figures 13**, **14** and **15**. Attach each EHU in place using eight #10-32 x 3/4" Phillips machine screws, flat washers and Nylok nuts. Proper EHU placement is with the EHU placed on top of the brackets, these should face towards the sky.

**<u>IMPORTANT:</u> A flat washer needs to be placed <u>BETWEEN</u> each bolt head and the plastic element housing to avoid damaging the housing when tightened.**

**Tighten the bolts securely—but not too tight.** If you over-tighten the nuts you may split the plastic flanges on the EHUs.

**<u>NOTE:</u>** If the eight mounting holes for the element housing do not line up with the eight holes in the element bracket it may be necessary to loosen the two horizontal bolts that hold the element bracket to the boom . After mounting the element housing to the element bracket be sure to re tighten the two horizontal bolts.

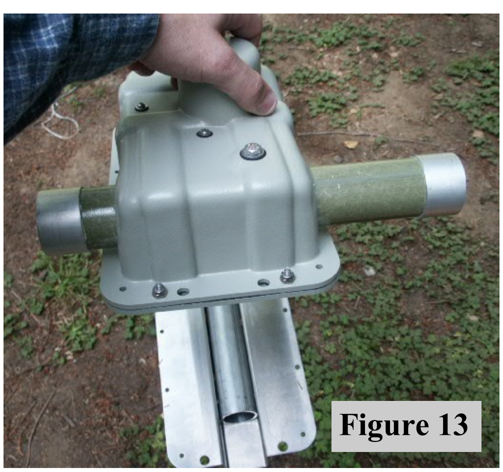


Figure 13

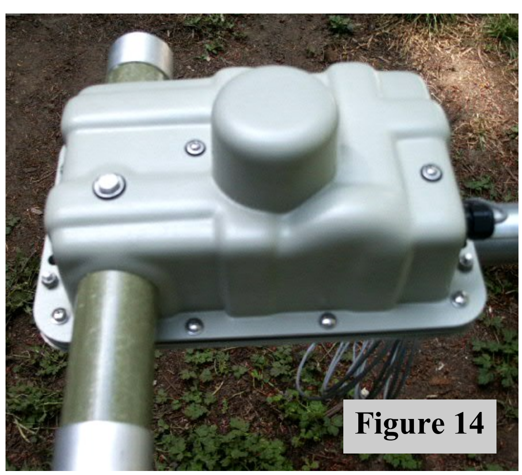


Figure 14

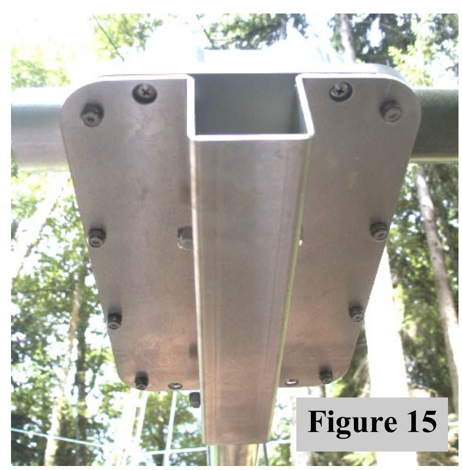


Figure 15

# Heat shrink tube instruction

On all elements we now include double wall polyolefin heat shrink, PN 10-1059-01. Each telescoping pole uses 3 pieces of the 1.5" x 3" long heat shrink, which forms an adhesive bond that is heat activated. Once finished, the seal is secure and waterproof. This new process replaces the use of electrical tape and silicone wrap.

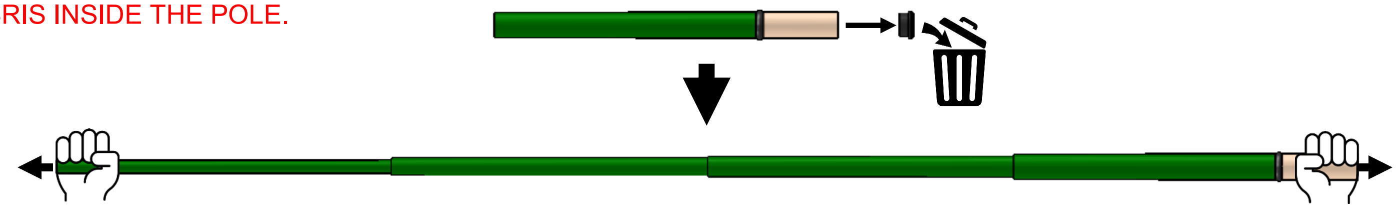
This product requires a heat gun for activation of the adhesive. When positioning the heat shrink, place it so that the joint of the telescoping pole is centered in the middle of the heat shrink. The pictures below exhibit how this is done. Apply heat around the entire area of heat shrink.

Note: There are 4 blue colored lines imprinted on the tubing. The joint is considered done being heated and waterproof when the lines change color to a yellowish green. Each line needs to change in color to ensure even adhesion temperatures. With this change, there is no longer any need to tape the joints on the loop elements.

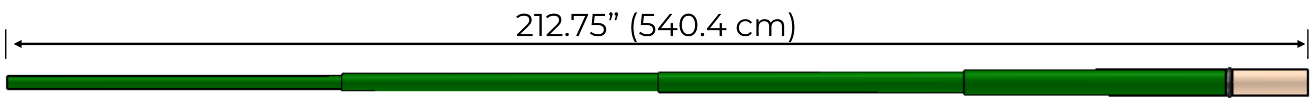

## CHAPTER TWELVE
## SECTION 12.0

# PREPARING THE TELESCOPING POLES

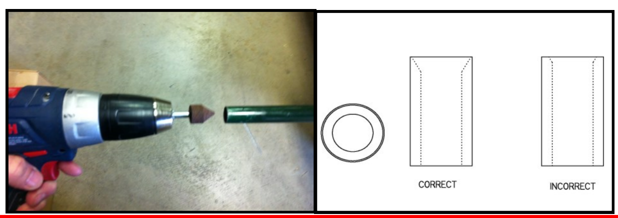
**1.** Extend the telescoping poles (PN 10-1013-02) to full length by firmly locking each section of the pole in place. A good methodology is to position each half of the joint so that they are several inches apart (while still within each other), and then pull quickly and firmly. Do this for each pole. There are rubber plugs inside the base section of each telescoping pole. These make it easier for handling, but they MUST BE REMOVED BEFORE ASSEMBLY. VERIFY THE FOAM INSERT IN THE PLUG HAS NOT MADE ITS WAY DOWN THE POLE AND THAT THERE IS NO OTHER FOREIGN DEBRIS INSIDE THE POLE.



**2.** With the poles fully extended, trim the end of the tip element of each pole so that the pole is 212.75 inches (540.4 cm) from the tip of the pole to the butt end, as shown below. ONLY trim the poles used for the 40/30 loops—if your antenna has 20m-6m straight elements, those should not be trimmed (must have a length of at least 213.1”). Use a hack saw, pipe cutter, or similar cutting blade that is suitable for fiberglass. Be sure that you cut the pole perpendicular to the length of the pole so that it is as “square” as possible.

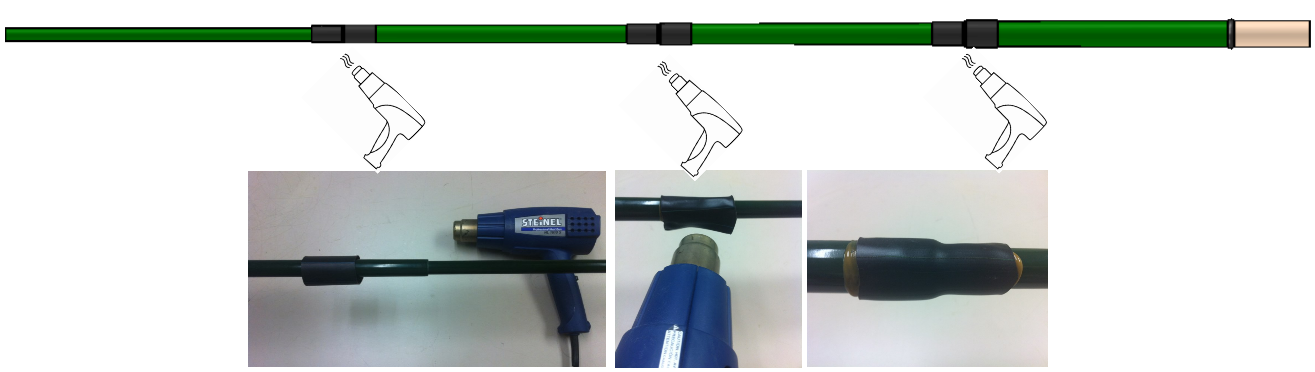



**3.** Using the conical drill bit, chamfer the tips of the 40/30 poles as shown below. The image below shows the proper angle to chamfer to. Clean out the interior of the fiberglass poles after chamfering it.

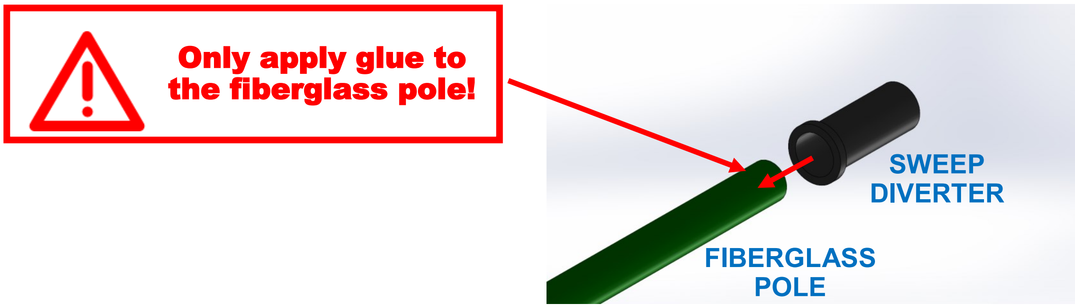



**LOOK INSIDE OF THE TELESCOPING POLE TO VERIFY NOTHING IS BLOCKING IT. YOU SHOULD BE ABLE TO SEE LIGHT AT THE OTHER END IF THE POLE IS KEPT STRAIGHT. DEBRIS INSIDE THE TELESCOPING POLES CAN LEAD TO FAILURE OF THE EHU.**

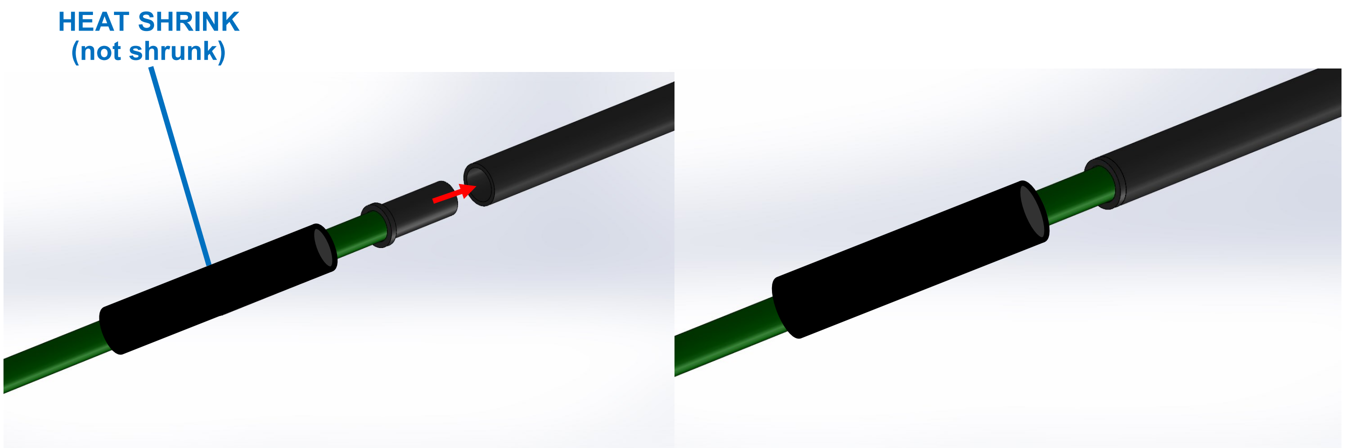
**4.** Each telescoping pole uses 3 polyolefin heat shrink pieces 1.5” x 3” (PN 10-1059-01), one covering each joint after it has been pulled tight. Once finished, the seal is secure and waterproof. This product requires a heat gun for activation of the adhesive.
**5.** When positioning the heat shrink, place it so that the joint of the telescoping pole is centered in the middle of the heat shrink.
**6.** Using a heat gun (hair dryers will NOT work), apply heat evenly around the entire area of heat shrink. Note: there are 4 blue colored lines imprinted on the tubing. The joint is considered done being heated and waterproof when the lines change color to a yellowish green. Each line needs to change color to ensure even adhesion temperatures.
**7.** The heat shrink will want to slide as it is heated so wear gloves and reposition the heat shrink to keep it centered on the joint as needed. Caution: The heat shrink will be HOT, wear insulated gloves!



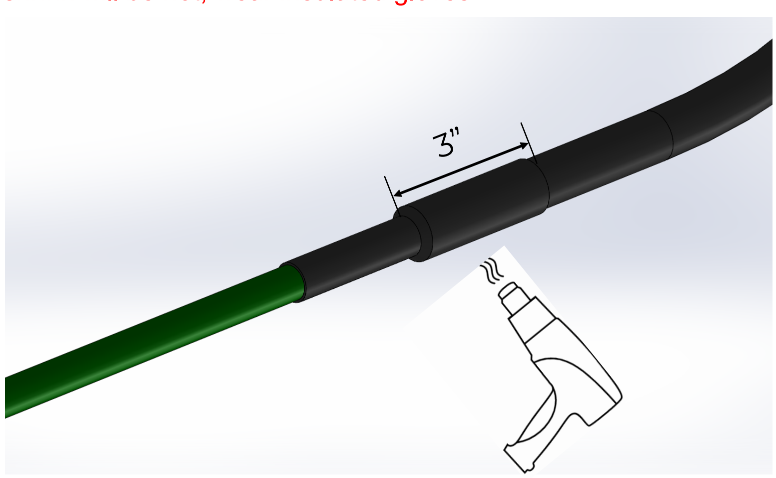
**8.** Use the glue kit (PN 72-0009-03) from the glue/tape kit to attach the sweep diverters (PN 10-1511-01) to the tips of the fiberglass telescoping poles. ONLY APPLY GLUE TO THE FIBERGLASS. Slowly rotate the sweep diverter as you slide it onto the pole to let the glue cover the most surface area possible. MAKE SURE THE SWEEP DIVERTER IS PUSHED AS FAR DOWN ONTO THE FIBERGLASS POLES AS POSSIBLE. The sweep diverter should be oriented in the same way as shown in the figure below, with the flanged edge towards the rest of the pole. Be sure the glue has dried completely before moving onto the next steps.




**9.** Put a piece of polyolefin heat shrink 1.1” x 6” (PN 10-1059-21) onto the telescoping pole, leaving the diverter clear. It should be down on the pole far enough that it doesn’t interfere with fitting the diverter into the sweep.
**10.** Insert the fiberglass pole, with the sweep diverter on it, into the sweep as far as possible. DO **NOT** GLUE THE SWEEP DIVERTER INTO THE SWEEP. Reposition the heat shrink to cover the joint.




**11.** Shrink the polyolefin sleeve over the joint as described on step 6 on the previous page; LEAVE AT LEAST 3” OF HEAT SHRINK ON THE SWEEP SIDE OF THE JOINT. **Be EXTREMELY careful not to overheat the poly sweep, you will deform or kink the material if too much heat is applied** (if this occurs you will need to undo your work and replace the poly sweep).
**12.** Remember, the heat shrink will want to slide as it’s heated. Reposition it as it cools to make sure the joint is fully covered. The heat shrink will be hot; wear insulated gloves.



# ATTACHING SWEEP COUPLERS TO SWEEP TUBES

- Refer to figure 12.06 during the following steps for an overview of the assembly process.
- Each of the sweep coupler halves (PN 10-1155-01) will have a notch in the mold on one side marked with silver sharpie. IT IS CRITICAL THAT THESE NOTCHES ARE POINTING TOWARDS THE SWEEPS OR THEY WILL NOT WORK PROPERLY. See figure 12.07 for the location of the mark. Be certain that each half of the coupler has the mark facing the sweep tube!

**13.** Place the coupler halves over the heat shrink on the sweep side of the joint. The flange on the diverter should still be visible through the heat shrink, as well as the edge of the sweep material. The non-marked side of the coupler should be placed as close to the edge of the sweep material as possible, without overhanging, as shown in the cutaway in figure 12.08 where the sweep diverter is highlighted in blue.
**14.** Insert four of the 6-32 x 2" socket head screw (PN 60-0186) with washer (PN 60-0016). Place the screws so that the threaded portion of the screw is facing downward. BE SURE THAT THE DRAIN HOLES FOR THE PLASTIC SWEEP TUBE ARE POINTING DOWNWARD BEFORE INSTALLING THE COUPLERS.
**15.** Apply anti-seize to the threads and screw the Nylock nuts on. Tighten using a 5/16" wrench/socket to turn the nut and the provided 5/64" Allen Key to hold the screw. Tighten enough so that the clamp is held in place on the sweep/heat shrink. Final tightening will happen once the fiberglass spreader is installed.
**16.** Repeat the previous steps on the other side of sweep tube.

**FIG. 12.06**

| Key | QTY | Part Number | Description |
|---|---|---|---|
| A | 6 | 60-0186 | Screw, 6-32 x 2", 18-8 Button Socket CS |
| B | 6 | 60-0014 | Nut, 6-32 Nylock |
| C | 4 | 60-0016 | Washer, 6-32, Flat |
| D | 1 | 10-1503-21 | Fiberglass Rod, 3/8" x 31-3/4" long, black |
| E | 2 | 10-1155-01 | Sweep Clamp, SCH-160 Clamp Half |
| F | 1 | 10-1153-01 | Poly Sweeps (100psi) |
| G | 1 | 10-1013-02 | Telescoping Pole, 18 foot 4 section |
| H | 1 | 10-1059-21 | 1.1" x 6" polyolefin heat shrink |

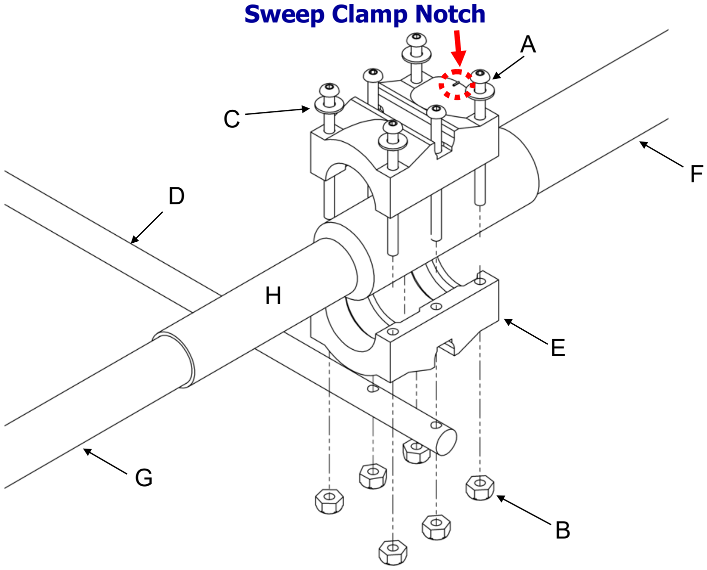
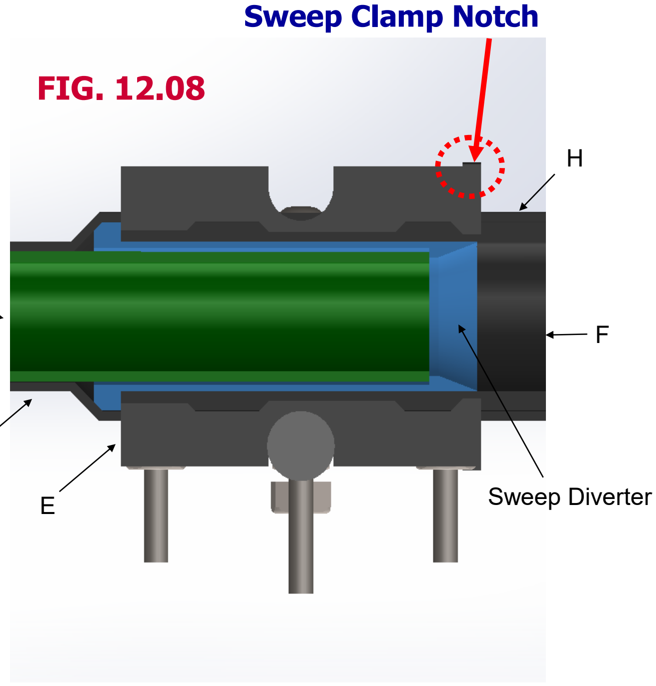



**FIG. 12.07**


**FIG. 12.08**



## MOUNTING THE FIBERGLASS SPREADERS

**17.** Mount the black fiberglass sweep spreaders (PN 10-1503-21) to the sweep couplers. There is a concave mounting area on each side of the plastic couplers. Position the fiberglass spreader so that the holes align with the clam shell couplers as shown in figure 12.10. When installing the fiberglass spreader, you will want the spreader to be underneath the plastic coupler as shown in figure 12.11. The spreaders will be longer than the couplers on each side of the loop. This is done on purpose to ensure plenty of fiberglass material is on each side of the screw.
**18.** Insert 2qty 6-32 x 2" socket head screw (PN 60-0186) through each of the coupler halves and the fiberglass rod. This screw must be placed so that the Nylock nut (PN 60-0014) is resting on the fiberglass material and the screw head are resting inside the concave groove on the top of the sweep coupler. Refer to figures 12.10 and 12.11 for detail. The screws are longer than necessary so that you can get the nut on in the initial stages.
**19.** Tighten the Nylock nuts firmly. Be sure to use anti-seize on these screws or they will likely gall and have to be replaced.
**20.** Repeat the previous steps on the other side of sweep tube.

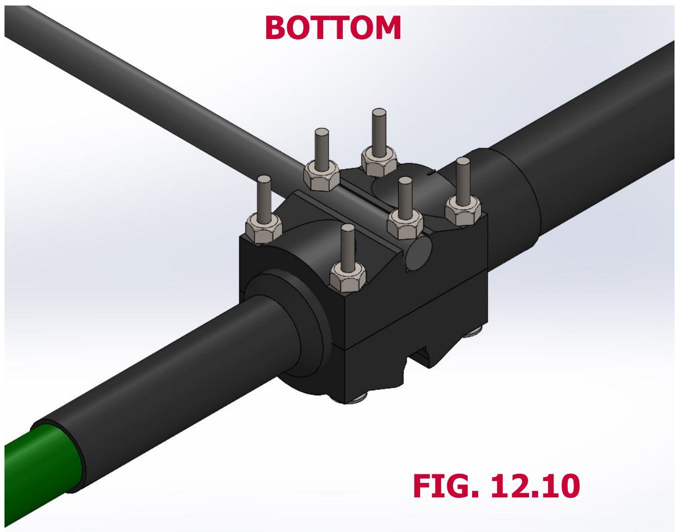



FIG. 12.10

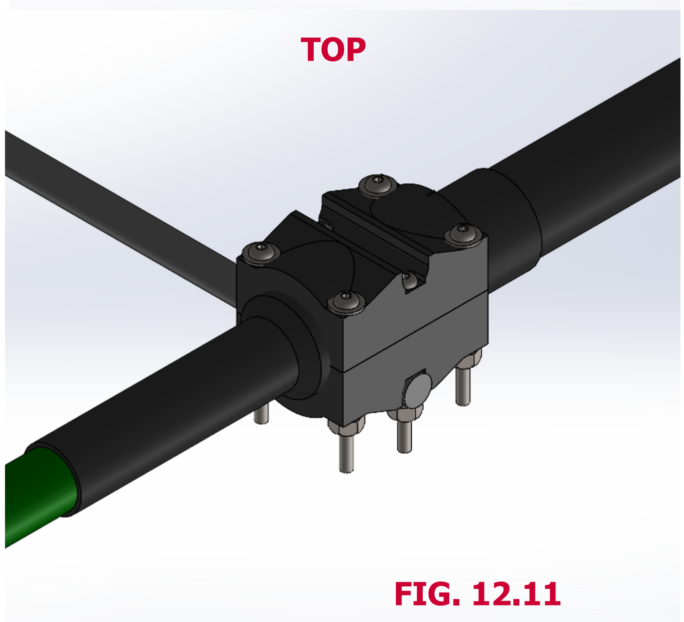



FIG. 12.11

**21.** Finish tightening the four screws on the outside corners of the plastic coupler. Tighten evenly, in an automobile X type pattern as shown in figure 12.14. If you do not tighten evenly, you may break the fastener. Once the outsides are firmly tight, tighten the two screws that hold the fiberglass spreader in place. Figure 12.15 shows the suggested method for tightening the screws.
**22.** When completely tightened, THE SWEEP COUPLER HALVES SHOULD HAVE GAP OF ABOUT 5/16” – 3/8”, as shown in figure 12.16. This gap is not critical as the coupler is mostly to keep the spreader in place properly. IT IS BEST TO LET THE SCREWS SIT FOR A WHILE (15-30MIN) AND TIGHTEN IN INTERVALS IN ORDER TO ALLOW THE PLASTIC CLAMP MATERIAL TO RE-FORM. This also will reduce the chance of snapping a screw.
**23.** Figure 6.17 shows the completed sweep—repeat the process for each sweep.

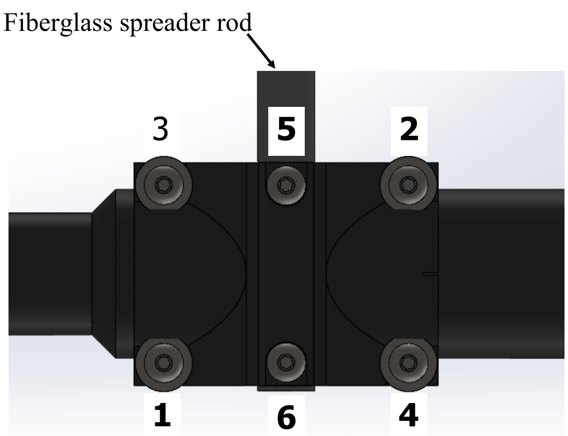



FIG. 12.14

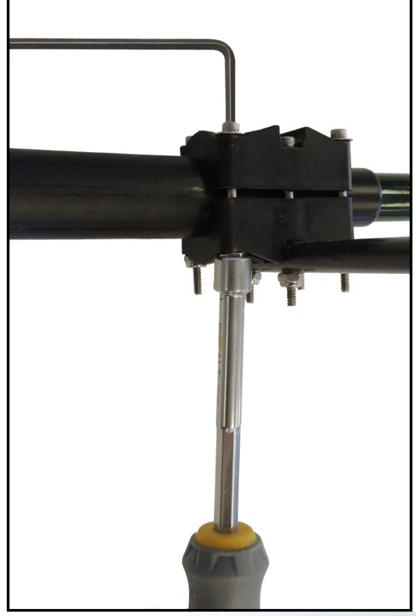


FIG. 12.15

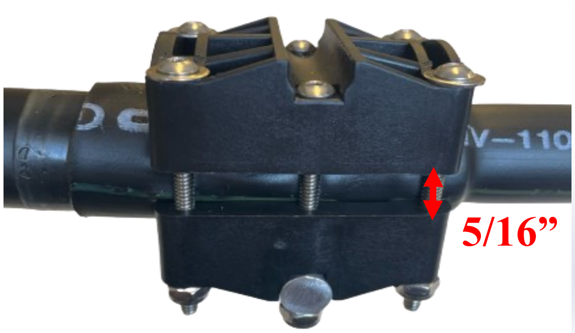



FIG. 12.16

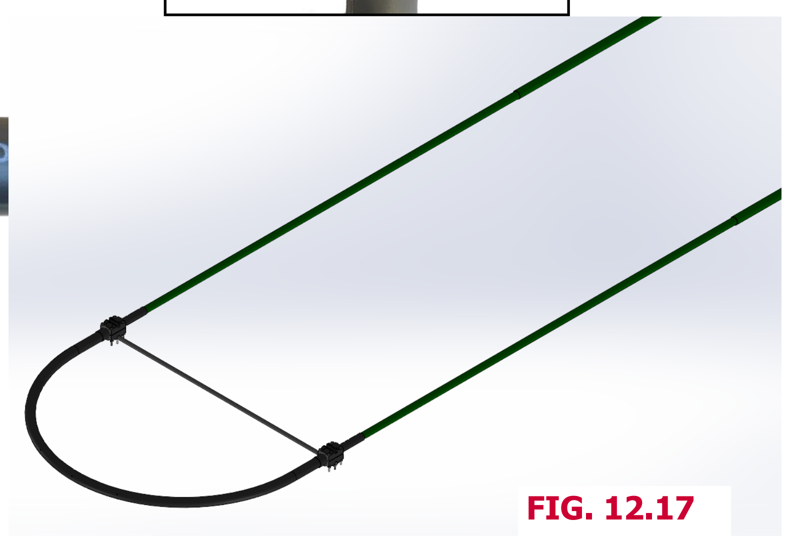


FIG. 12.17

## ELEMENT SUPPORT TUBE PREPARATION (continued)

## ATTACH FOAM PLUG HOUSINGS TO NON-LOOP TELESCOPING POLES

Each 20m-6m telescoping pole tip requires a breathable foam plug to allow for venting of the EHU. The foam plug assembly (PN 70-1007-01) consists of a special UV resistant foam plug material, a plastic housing and a metal screen as shown in figure 12.30.

The foam plug is installed inside the plastic housing at the factory. No trimming or chamfering is required for the 20m-6m telescoping poles used for the driven element.

The fit of the plastic housing on the pole tip is purposely very tight, so that the foam plug assembly will stay in place. Before attaching the plastic housing, spread a small amount of dish soap around the inside edge of the plastic housing as shown in figure 12.31. This helps the housing slide on easily, and the soap will eventually evaporate, leaving you with a firm interference fit.

Insert the plastic housing onto the telescoping pole tip as shown in figure 12.32. Be sure that the plastic housing bottoms out on the pole tip.

Repeat for the other non-loop telescoping pole tips.

**FIG. 12.30**

**FIG. 12.31**


**FIG. 12.32**

# ATTACH THE ELEMENTS TO THE EHU's

## PREPARE THE CPVC INNER-GUIDE TUBE & DIVERTER CONE

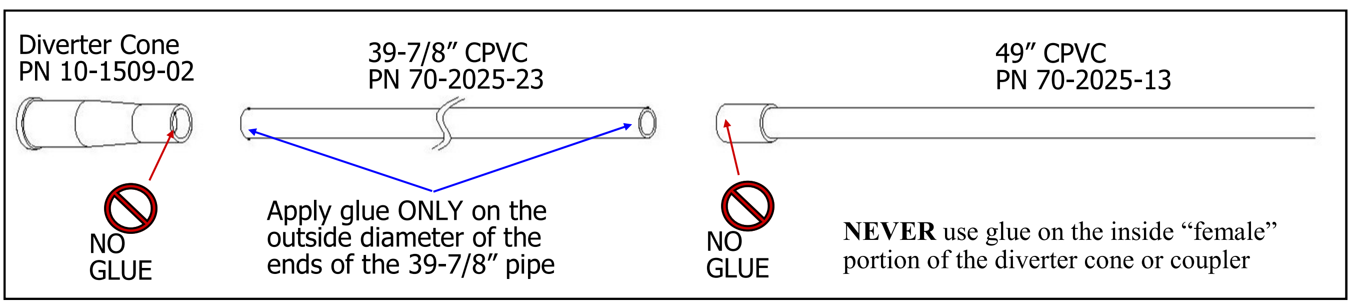
The 40/30 loops on the DB18 Yagi use a plastic tube and a diverter cone located inside the telescoping pole, to guide the copper strip out of the EHU. The plastic tube is off-white and is made of CPVC. There are 3 pieces that make up the guide tube assembly: The diverter cone (PN 10-1509-02), the 39-7/8" section of 3/4" CPVC with no coupler (PN 70-2025-23) and the 49" section of 3/4" CPVC with a coupler attached to one end (PN 70-2025-13). This guide tube is only required for 40/30 loop elements. The guide tube is not needed on the return side of the loop.

The smaller diameter end of the diverter cone is glued to one end of the 39-7/8" CPVC tube. Use the supplied glue and applicator. Apply the glue evenly around the outside diameter of the tube. Be sure you get even coverage all the way around the tube. Cover about 3/4" of an inch deep. Firmly push the 39-7/8" CPVC tube into the diverter cone end as shown in. Let the glue dry at least 20 minutes before moving it.

Apply glue evenly around the outside diameter of the 39-7/8" CPVC tube. Apply approximately 3/4" deep as per prior step. Locate the 49" CPVC tube (PN 70-2025-13) with coupler. Push the 39-7/8" tube firmly into the coupler.

Repeat above instructions for remaining guide tube assembly's (two per EHU, four total).

**WARNING**: Do not apply glue to the inner "female" portion of either the diverter cone or coupler. The glue applied to the outside of the tube is sufficient to bond the two pieces, and will prevent potential for damaging obstructions being formed by dried glue.





## ATTACH THE ELEMENTS TO THE EHU's (continued)

### SECURING THE ELEMENT SUPPORT TUBE (EST) TO THE EHU

When the CPVC inner guide tubes are completed, they will need to be inserted into the telescoping poles and secured to each EHU. The drawing below shows placement for a reflector element, but the procedure is the same for driven elements.

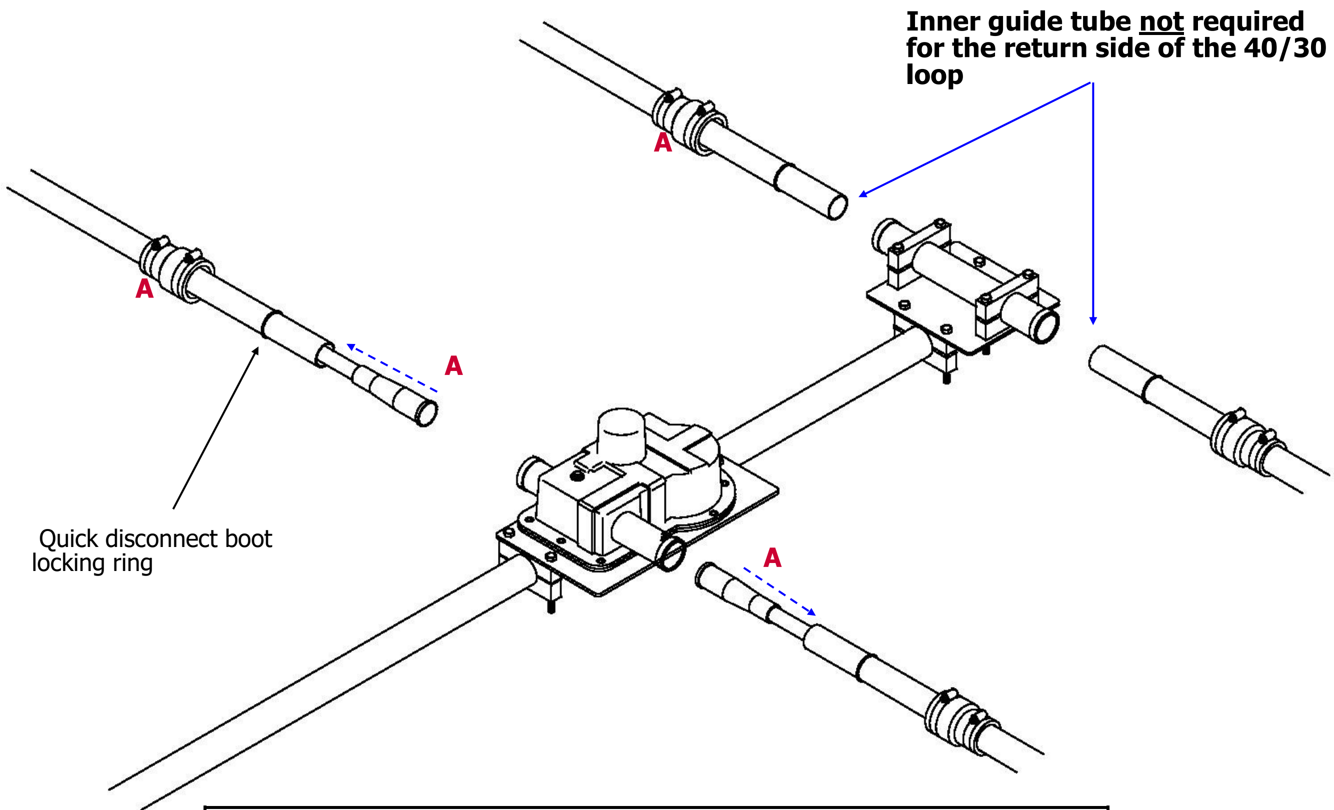
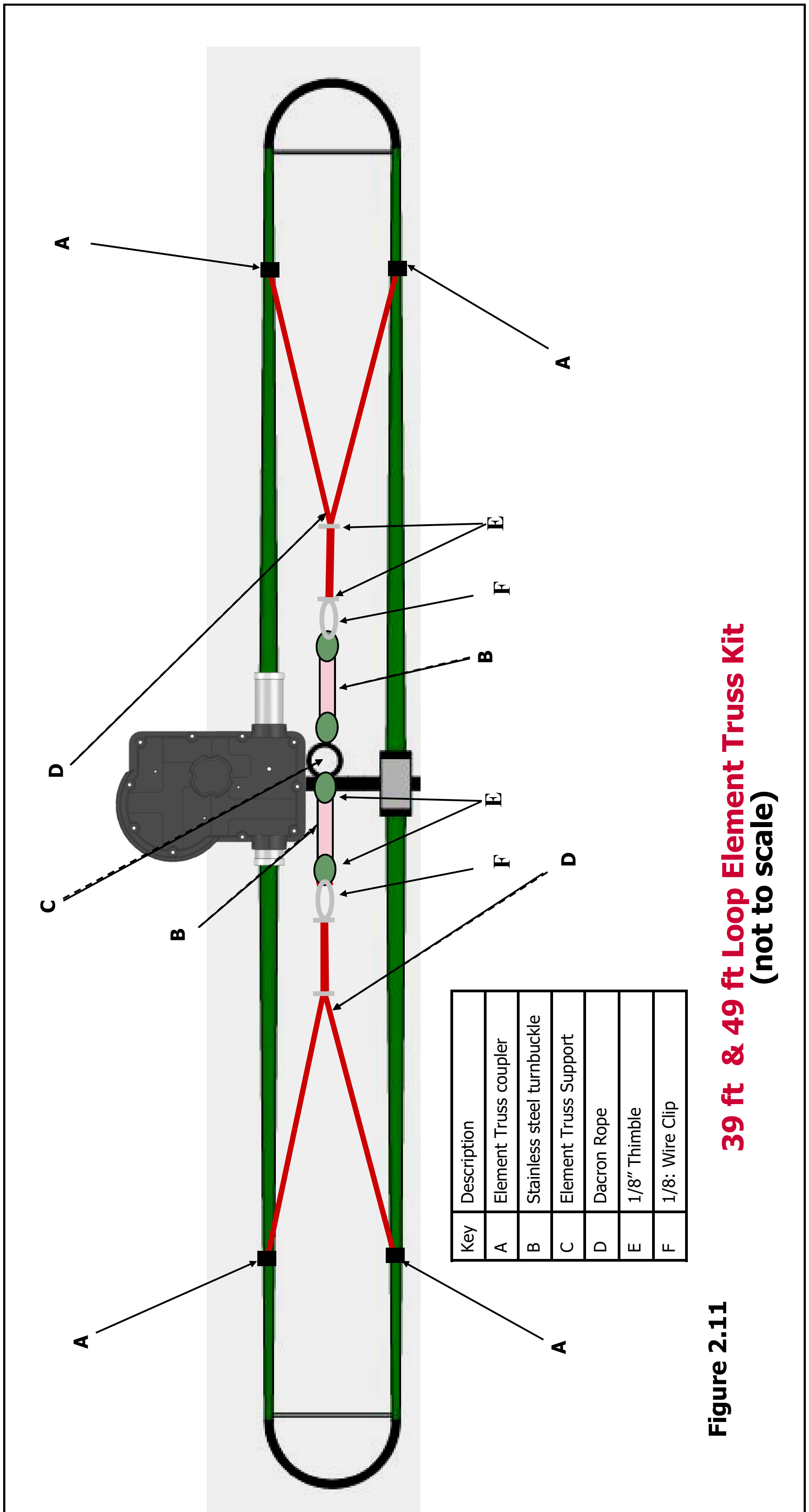



Figure A:

Inner guide tube assembly consisting of diverter cone , 39-7/8" and 49" CPVC Plastic tube, glued together. They are only used on the EHU side of the 40/30 loop

**NOTE: THIS IS A DRAWING OF A DB SERIES ANTENNA—THE ONLY DIFFERENCE FOR THE 2, 3 AND 4 ELEMENT YAGI WOULD BE U-BOLTS BEING USED INSTEAD OF SADDLES AS SHOWN IN THIS DRAWING. THIS DRAWING IS BEING UPDATED TO MACTH THIS DOCUMENT**

# ELEMENT TRUSS OVERVIEW




| Key | Description |
|---|---|
| A | Element Truss coupler |
| B | Stainless steel turnbuckle |
| C | Element Truss Support |
| D | Dacron Rope |
| E | 1/8" Thimble |
| F | 1/8: Wire Clip |

**39 ft & 49 ft Loop Element Truss Kit (not to scale)**

**Figure 2.11**

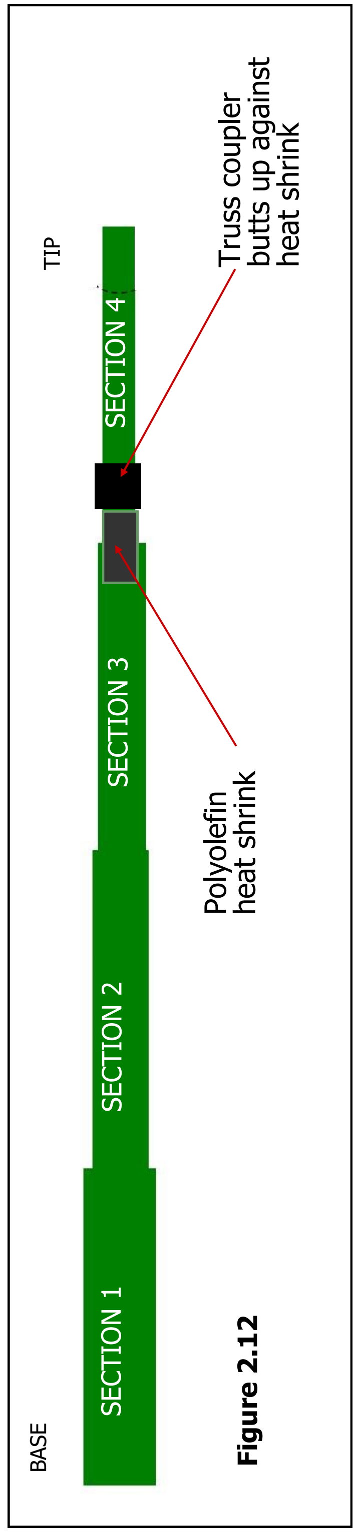
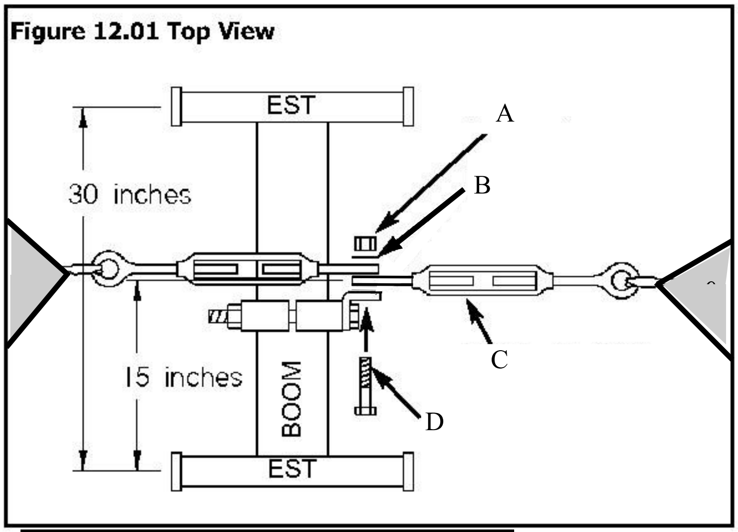


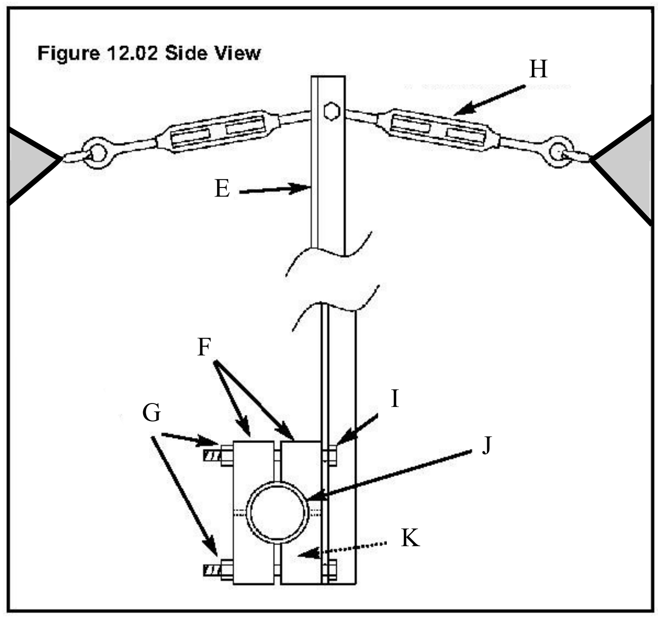

**Figure 2.12**

# ELEMENT TRUSS SUPPORT

- Check and inventory that you received all the parts for the 39 ft 40M/30M truss option.
- Be sure to use anti-seize on all of the stainless steel fasteners in this step. Failure to do so will potentially cause them to seize/gall.

1. Secure the element truss support (PN 10-1054-01) to the aluminum saddles so that the head of the 5/16" bolt are on the truss support side as shown in Figure 12.02. Secure the truss support and saddle assembly around the boom so that its halfway between the driven EST and return EST as shown in Figure 12.01. **NOTE: The DB18E truss support for the DRIVEN element is completely different than all of the other antenna models. Refer to page 9 for these instructions. For the two end elements on the DB18E, follow instructions on this page (Pg 10).** It is not critical which side of the boom the truss support is on. Use the boom as a line to sight in the truss support so that it is perpendicular to the boom. Level the support before tightening as shown in figure 14.03. After tightening, insert a set screw into the exposed saddle and tighten.




| Key | QTY | Part # | Description |
|---|---|---|---|
| A | 1 | 60-0030 | 1/4" SS nylock nut |
| B | 2 | 60-0033 | 5/16" SS washer |
| C | 2 | 60-0083 | 4" SS turnbuckle |
| D | 1 | 60-0110 | 1/4" X 1-1/4" SS hex bolt |
| E | 1 | 10-1054-01 | 30m / 40m truss support |
| F | 2 | 10-1601-03 | 1-3/4" Aluminum saddle |
| G | 2 | 60-0046 | 5/16" SS nylock nut |
| H | 2 | 60-0083 | 4" SS turnbuckle |
| I | 2 | 60-0065 | 5/16" X 3-1/2" SS hex bolt |
| J | 1 | N/A | Antenna Boom |
| K | 2 | 10-1601-22 | 2" saddle |

Figure 14.01

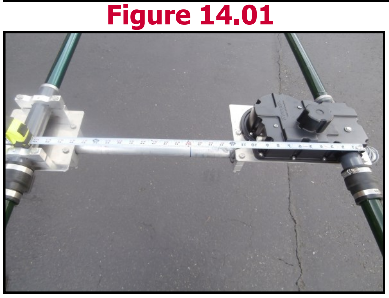


Figure 14.02

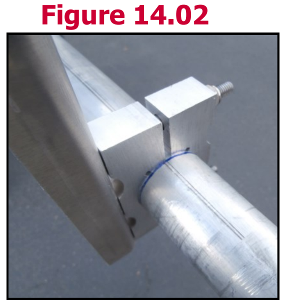
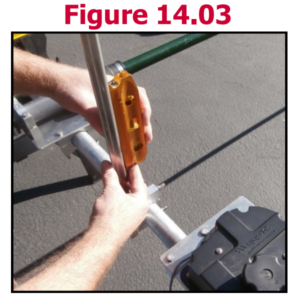


Figure 14.03



# ELEMENT TRUSS SUPPORT CONT.

Figure 14.04

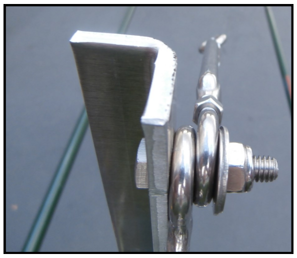


Figure 14.05

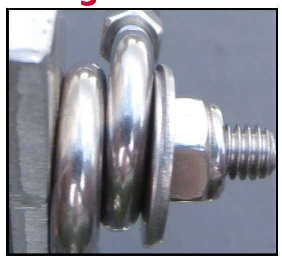
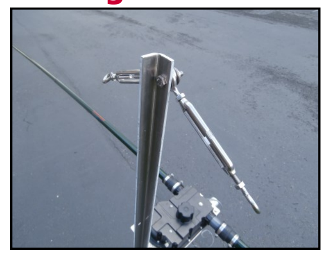


Figure 14.06



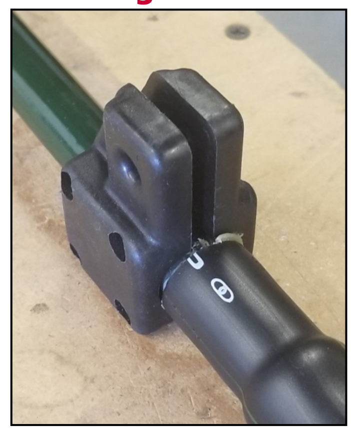
# ELEMENT TRUSS COUPLER

1. Each element truss coupler consists of 2 halves as shown in **figure 2.01**. The element truss couplers (PN 10-1510-01) are used for fastening the Dacron rope to the last section of the telescoping poles. **Figure 2.12** on page 8 provides an expanded view of a truss element assembly.
2. Position each coupler so that it is flush to the polyolefin heat shrink on the smallest joint of the telescoping pole as shown in **figure 2.02** and **2.03**. **DO NOT** place the coupler over the polyolefin heat shrink or it will not seat properly. **Figure 2.12** on page 8 shows the location respective to the telescoping pole to mount the truss coupler.

Figure 2.01

Figure 2.02

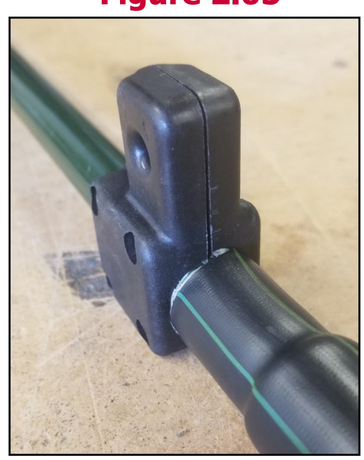
Figure 2.03



3. Insert the 6-32 x 7/8" stainless steel screws (60-0014-01) through the round opening and place the 6-32 nylock nuts (60-0014) in the hex opening of the element truss coupler. These are handy for holding the #6 Nylock nut (PN 60-0014) when tightening, but you will need to position your finger over the nut to keep it from spinning when you thread on each of the #6 x 7/8" pan-head machine screw (PN 60-0014-01). Tighten the stainless steel screws and Nylock nuts. Be sure your couplers are perpendicular to the pole and level before final tightening. **Figure 2.04** and **figure 2.05** show the coupler when tightened. They should be flush or have a small gap between the couplers.

Figure 2.04

Figure 2.05



# ELEMENT TRUSS COUPLER

4. The Dacron rope is provided in a single piece. You will need to trim the pieces to length as you proceed in installing each half-portion of the truss. Melt the end of the rope with a lighter as shown in **figure 2.09** to insure it does not fray. Thread the Dacron rope through the single larger hole at the top portion of the coupler as shown in **figure 2.06**, so it is tight and the elements are level, with the turnbuckle approximately half way unscrewed. This should let approximately 10" of rope stick out the other end. Secure the rope to the coupler using four half-hitches, leaving approximately 4" extra rope or "leader". Run the rope up the telescoping pole towards the stainless steel eye-bolt/thimble and then thread the rope through the thimble and back down to the truss coupler opposite of the one that is already secured. **Figure 2.07** shows the Dacron rope tied to the element truss coupler.

Figure 2.09

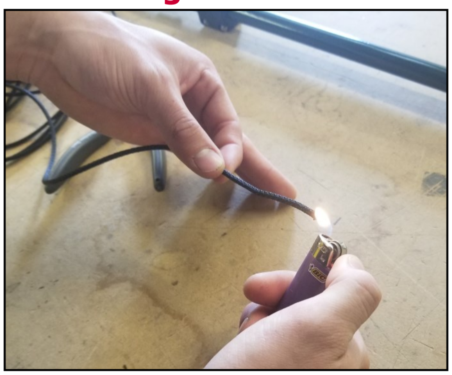


Figure 2.06


Figure 2.07

5. Tape the leader to the main truss line as shown in **figure 2.08**, trim the rope for that portion of the truss and repeat for the next. There will be more than enough rope. Tape the leader to the other portion of the rope as shown in **figure 2.08**. Electrical tape works fine for this.
6. Melt the other end of the rope with a lighter as shown in **figure 2.09** to insure it does not fray. **Figure 2.10** shows the finished coupler with the Dacron rope secured.

Figure 2.08

Figure 2.10

# ELEMENT TRUSS SUPPORT

3. Loop 1/8” Dacron rope (PN  21-7001-01) around each thimble as shown in **Figure 2.18**.
4. Secure each rope length together with two 1/8” Wire Clips (PN 60-0157). There should be about 3” between each clip as shown in **Figure 2.19**.

Figure 2.18

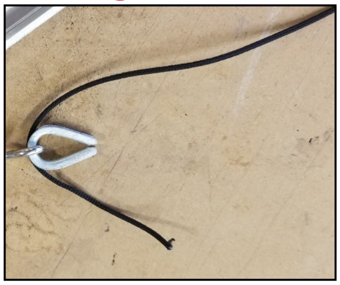
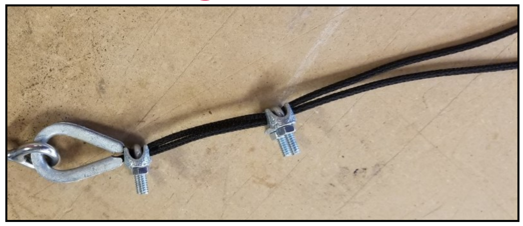


Figure 2.19



5. Repeat steps three and four such that both turnbuckles have a rope length attached as shown in **Figure 2.20**.
6. Loosen turnbuckles by unscrewing them such that they are fully extended as shown in **Figure 2.20** and **Figure 2.21**.

Figure 2.20

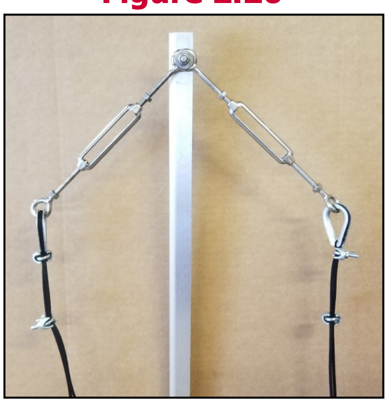


Figure 2.21

## Attach the Fiberglass Element Support Tubes to the Element Housing Units

The butt ends of the green fiberglass poles may very slightly in outside diameter. Some of them may have been sanded, while others were not. The colors at the ends will be either natural, or black. The difference in colors has no affect on performance. Do not be concerned if they vary slightly in tightness when being installed on the EHUs. This is normal. All poles are tested at the factory prior to shipping, however in the event the pole just won't fit sanding it is okay.

The EHTs on the EHUs have aluminum reinforcing rings attached to provide extra strength in high wind conditions (**Figure 23**).

Locate the eight rubber boots and repeat the following procedure for each of the eight fiberglass poles.

- Place the narrow end of a rubber boot onto the butt end of an EST. Slide it about 6" out onto the EST (**Figure 24**).

**Figure 54**

**Figure 55**

**Figure 56**

**Figure 57**

- Insert the butt end of that EST into one of the EHTs on an EHU, as shown in **Figure 25**. **It is very important to ensure that the butt end of the EST firmly bottoms out inside the EHT. Make sure the EST is seated all the way into the EHT. Then push the rubber boot firmly onto the EHT until the hose clamp is past the aluminum ring and will clamp down onto the fiberglass EST.** The correct mounting position of the rubber boot is shown in **Figure 26**. Note that current production antennas now have a narrower aluminum ring (.4"). **It is imperative that the stainless steel hose clamp be located so that the clamp on the outside of the rubber boot on the EHU side of the connection is completely PAST the the aluminum reinforcing ring. This ensures that the hose clamp can grip onto the fiberglass and the ring will prevent the rubber boot from ever coming off.**

- Firmly tighten both stainless steel hose clamps, one over the EHT and the other over the EST. Then test the connection by pulling and twisting it. There should be no slippage at the joints.

NOTE: You should re-tighten each clamp a second time (at least 30 minutes after the first time you tightened them) before raising the antenna to the tower, to be sure that there has been no cold flowing of the PVC material on the rubber boot.

## Install the Optional 6 Meter Passive Element (If ordered)

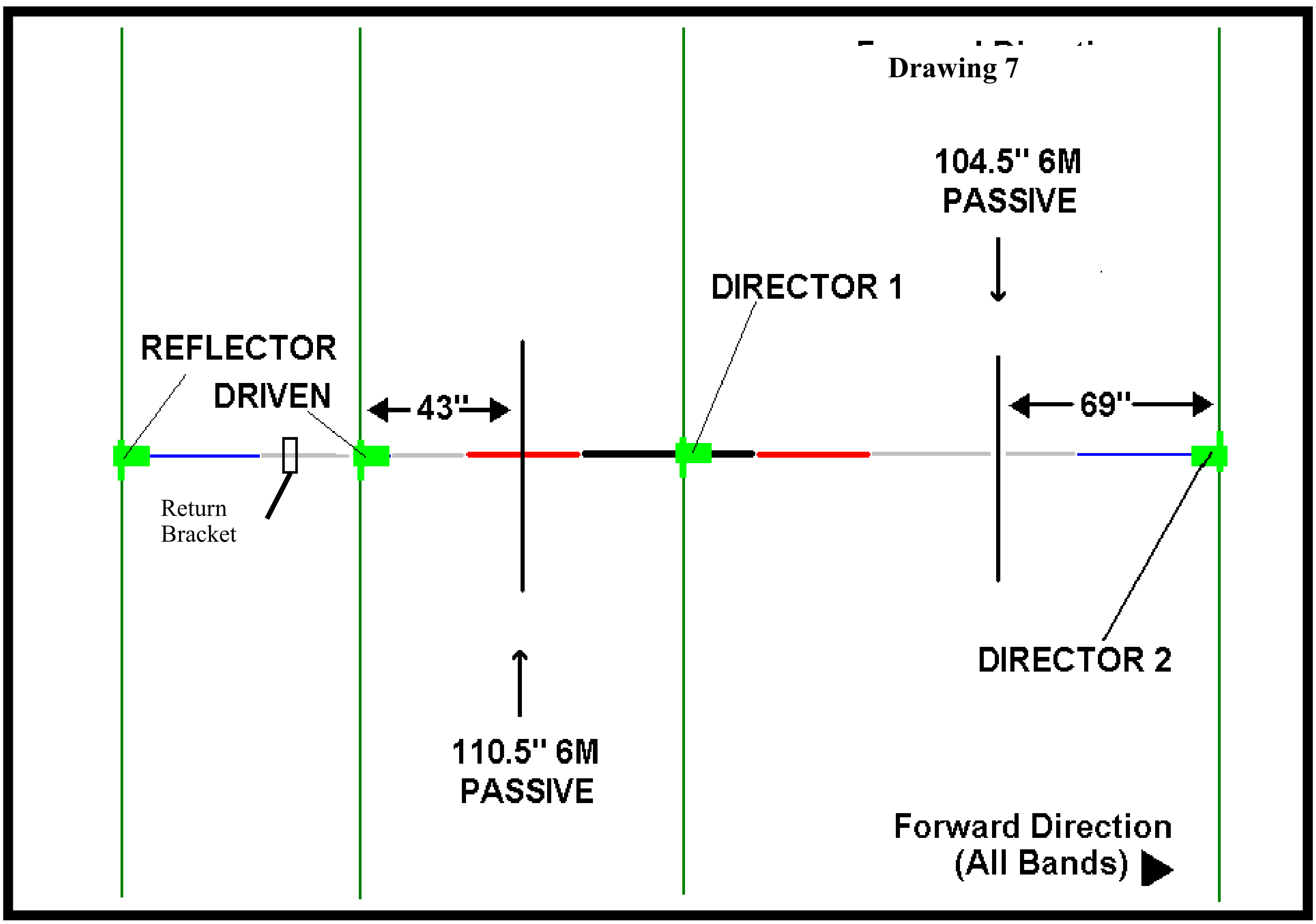
If you have purchased the optional 6M passive element kit:.

Locate: (Ref: **Picture 31**)

- One 6M passive element kit 110.5" (long)
- One mounting kit (long)
- One 6M passive element kit 104.5" (short)
- One mounting kit (short)
- Blue packet of Connector Protector

Using their respective hardware kits (long & short - **Picture 31**) assemble the two 6M passive elements. Identify the ends of the 3/8" tubing that have the shortest distance from the end of the tubing to the drilled hole. Lightly coat the circumference of these ends with a very thin film of the connector protector. Slide the coated ends of the 3/8" tubing into the 1/2" tubing and align the holes.

**Drawing 7**

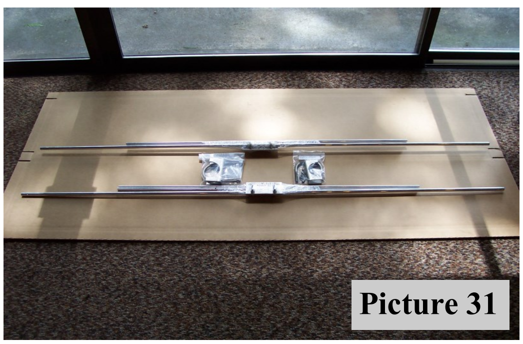


**Note:** Verify that the long element measures 110.5" and the short element measures 104.5".

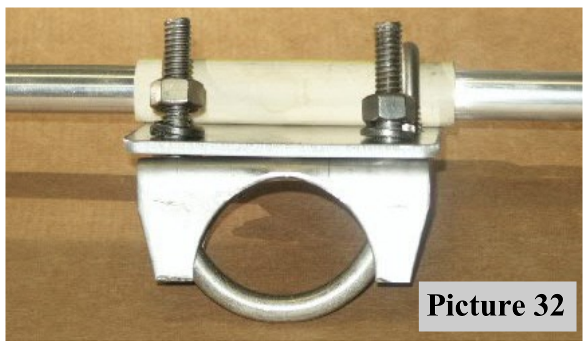
Securely fasten the pieces together with the 6-32x3/4" machine screws and Nylok nuts and install the U-bolt on the center bracket as shown in **Picture 32.5.**

The 6M passive elements should be mounted on the top side of the boom, the same as the other elements, using the U-bolts and saddles shown in (**Picture 32**). Using a tape measure, determine the correct passive element placement as shown in **Drawing 7**. Be sure to measure from the actual center line of the 6m passive element, NOT from where the U-bolt attaches (**Picture 32.5**). Make sure the elements are aligned with the green fiberglass poles. Tighten securely.

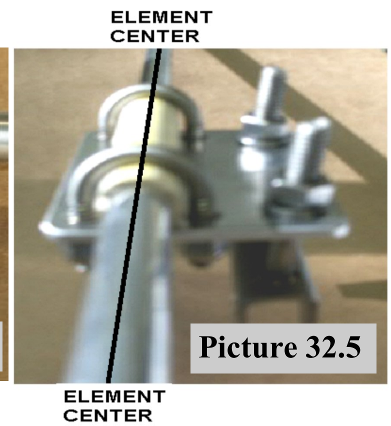
Warning: When attaching the 6m passive to the boom be careful not to trap the element control cable under the U-bolts.



Picture 31



Picture 32




Picture 32.5

## Install the Boom Truss Support Assembly

Locate the sixteen 3/16" galvanized cable clips, four 3/16" galvanized thimbles, two 1/4" x 4" galvanized turnbuckles and the 26 feet of 1/8" non-conductive Phillystran® Kevlar™ cable.

Using a hammer, lightly tap the thimbles so that the center opening is forced onto the eye bolt at the end of the boom (**Figure 33**). Press the thimble back together as close as possible once it is through the eyebolt. Thread the Phillystran through the eyebolt, so that it rests on the channel of the thimble. You will use approximately 12" of Phillystran to loop through the eyebolt (six inches down, six inches back) as shown in **Figure 34**.

Figure 33

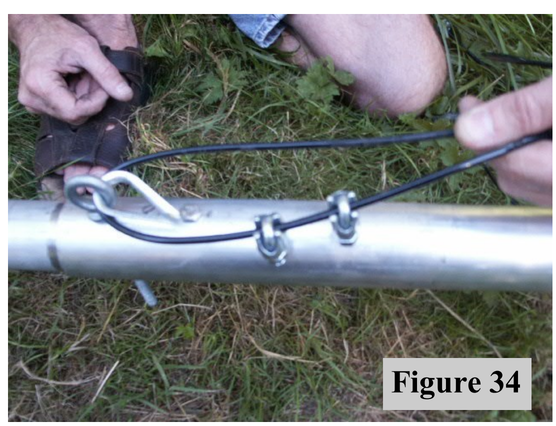


Figure 34

**DO NOT CUT THE PHILLYSTRAN CABLE UNTIL YOU HAVE INSTALLED ONE SIDE OF THE TRUSS—
THE MEASUREMENTS FOR EACH SIDE ARE NOT EQUAL IN LENGTH.**

Attach the cable clips to the Phillystran, with the first one as close to the end of the thimble as possible, so the cable will be "locked" in, and the next three approximately 1" apart (**Figure 35**). **Figure 35.6** is a sample cable made up for the picture only to show what a finished cable will look like. You will want to thread the Phillystran into the cable clip, so that one section is on top of the other, as shown in **Figure 35.4**. Tighten the nuts securely.

Locate the 2" U-bolt, saddle, two 5/16" nuts, 2" flat plate and two 5/16" Nylok nuts. Position the U-bolt 26" to 30" above the boom on the antenna mast and secure with the two 5/16" stainless nuts (do not use the Nylok nuts yet). Position the eye of the turnbuckles on each leg of the U-Bolt, place the 2" flat plate behind them, and fasten the 5/16" Nylok nuts securely as shown in **Figure 36**. When properly secured, cut the remaining Phillystran cable for use on the other half of the truss.

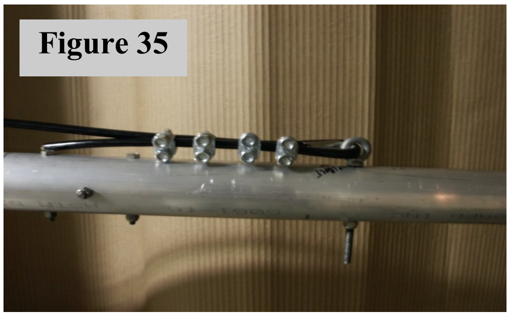


Figure 35


Figure 35.4

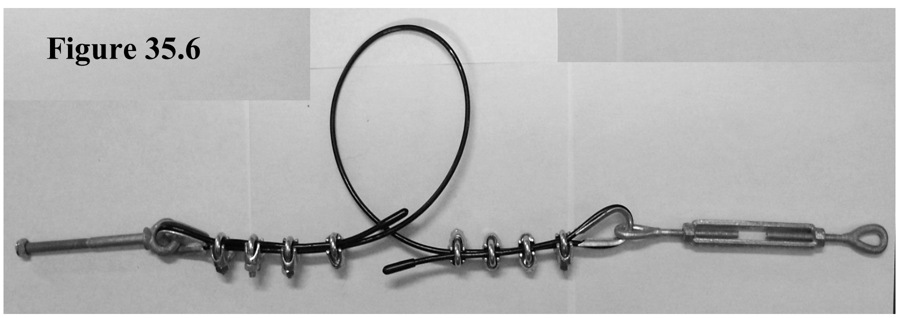


Figure 35.6

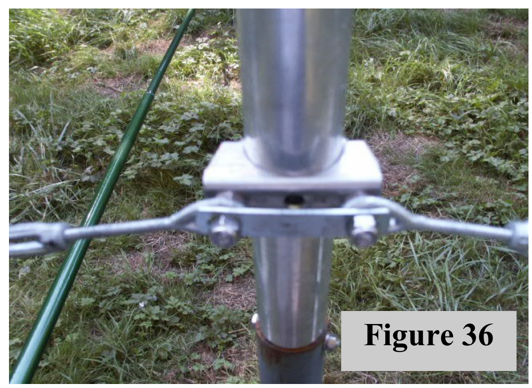


Figure 36

Attach the thimbles, Phillystran and wire clips in the same manner as in step one. The finished assembly should look like **Figure 38.**

While holding the Phillystran in one hand (this will prevent the cable from twisting while you tighten the turnbuckles), tighten the turnbuckles using a wrench or screwdriver as a lever, until the boom is evenly supported and level on both sides. When the turnbuckles are correctly tensioned secure them with a safety wire as seen in **Figure 39** to prevent them from working loose.


Figure 38

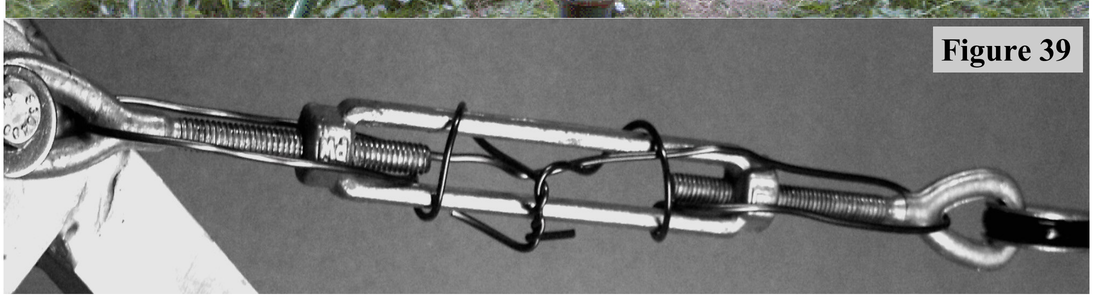


Figure 39

## SteppIR Performance

SteppIR antennas are developed by first modeling the antenna using YO-PRO and EZ-NEC. We created antennas that had maximum gain and front to rear without regard for bandwidth.

The antennas that reside in our controllers memory are all optimized for gain and front to rear with a radiation resistance of approximately 22 ohms (16 ohms to 30 ohms is considered ideal for real world Yagi's. The modeling also takes into account the changing electrical boom length as frequency changes. When the 180 degree function is enabled, a new Yagi is created that takes into account the change in element spacing and spacing and in the case of 4 element antennas creating a two reflector antenna to get maximum use of all elements . The result is slightly different gain and front to rear specifications.

We then go to the antenna range and correlate the modeled antenna to the real world. In other words, we determine as closely as possible the electrical length of the elements. We are very close to the modeled antennas, but it is virtually impossible to get closer than a few tenths of a dB on gain and several dB on front to rear.

**There are three factors that make our antennas outstanding performers:**

1. They are tuned to a specific frequency for maximum gain and front to rear – without the compromise in performance that tuning for bandwidth causes.
2. They are very efficient antennas with high conductivity conductors, a highly efficient matching system (99% plus) and low dielectric losses.
3. There are no inactive elements, traps or linear loading to reduce antenna performance.

## Fixed Element Spacing and the SteppIR Yagi

First of all, there really is no "ideal" boom length for a Yagi. To get maximum gain the boom of a three element beam should be right around .4 wavelengths long. This would allow a free space gain of 9.7 dBi, however the front to back ratio is compromised to around 11 dB. If the boom is made shorter, say .25 wavelengths, the front to back can be as high as 25 dB, but now the maximum gain is about 8.0 dBi. Shorter booms also limit the bandwidth, which is why right around .3 wavelengths is considered the best compromise for gain, front to back and bandwidth for a fixed element length Yagi. It turns out that being able to tune the elements far outweighs being able to choose boom length. We chose 16 feet for our three element boom length which equates to .23 wavelength on 20 meters and .46 wavelength on 10 meters, because very good Yagi's can be made in that range of boom length if you can adjust the element lengths. This compromise works out very well because 10m is a large band and F/B isn't as important so you get excellent gain with still very acceptable F/B. When bandwidth is of no concern to you (as it is with our antenna), you can construct a Yagi that is the very best compromise on that band and then track that performance over the entire band. It is this ability to move the performance peak that makes the SteppIR actually outperform a mono-bander over an entire band – even when the boom length isn't what is classically considered "ideal". Bear in mind that a Yagi rarely has maximum gain and maximum front to back at the same time, so it is always a compromise between gain and front to back. This is the same philosophy we use on all of our yagi antennas to give you the most performance available for a given boom length. With an adjustable antenna you can choose which parameter is important to you in a given situation. For example, you might want to have a pile-up buster saved in memory, that gets you that extra .5 – 1.0 dB of gain at the expense of front to back and SWR – when you are going after that rare DX!

## RF Power Transmission with the SteppIR Yagi

The RF power is transferred by brushes that have 4 contact points on each element that results in a very low impedance connection that is kept clean by the inherent wiping action. The brush contact is .08 in thick and has proven to last over 2 million band changes.   The copper beryllium tape is .545 inches wide and presents a very low RF impedance.  The type of balun we are using can handle tremendous amounts of power for their size because there is almost no flux in the core and they are 99% efficient. That coupled with the fact that our antenna is always at a very low VSWR means the balun will handle much more than the 3000 watt rating, how much more we don't know. Jerry Sevicks book "Transmission Transformers" (available from ARRL) has a chapter (Chap. 11) that discusses the power handling ability of ferrite core transformers.

**WARNING:** **WHEN OPERATING WITH MORE THAN 200 WATTS, DO NOT TRANSMIT WHILE THE ANTENNA IS CHANGING BANDS.  A MISMATCH AT ELEVATED WATTAGES MAY CAUSE DAMAGE TO THE DRIVEN ELEMENT.**

## Balun / Matching System

The SteppIR has a matching system that is included in all Yagi antennas (a balun is  available as an option on the dipole).  Our antenna designs are all close to 22 ohms at all frequencies, so we needed a broadband matching system that would transform 22 ohm to 50 ohm.  We found an excellent one designed by Jerry Sevick, that is described in his book "Building and Using Baluns and Ununs".

Our matching network is a transmission line transformer that is wound on a 2.25 inch OD ferrite core that operates with very little internal flux (**Figure 40**), thus allowing it to function at very high power levels.  The transformer includes a 22 ohm to 50 ohm unun and a balun wound with custom made, high power, 25 ohm coax for superior balun operation.  Jerry has espoused these transformers for years as an overlooked but excellent way to match a Yagi, he would probably be proud to know they are being used in a commercial Yagi.  This matching network does not require compressing or stretching a coil, or separating wires to get a good match – something that can easily be bumped out of adjustment by birds or installation crews.

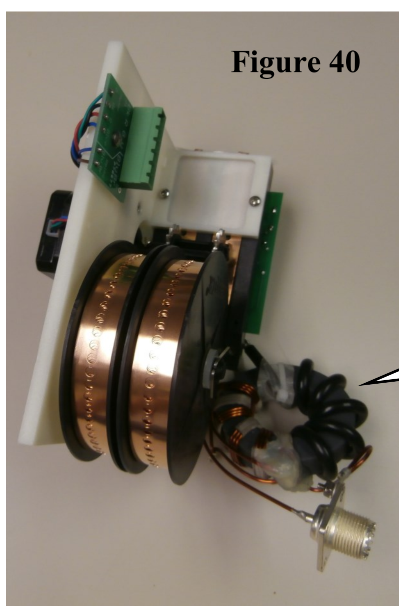


**Figure 40**

Balun

## ***Yagi Gain / Front to Back Modeling***

SteppIR antenna designs are all close to 22 ohms at all frequencies, so we needed a broadband matching system. We found an excellent one designed by Jerry Sevick, that is described in his book "Building and Using Baluns and Ununs".

Our matching network is a transmission line transformer that is wound on a 2.25 inch OD ferrite core that operates with very little internal flux, thus allowing it to function at very high power levels. The transformer includes a 22 ohm to 50 ohm unun and a balun. Jerry has espoused these transformers for years as an overlooked but excellent way to match a Yagi, he would probably be proud to know they are being used in a commercial Yagi. This matching network does not require compressing or stretching a coil, or separating wires to get a good match – something that can easily be bumped out of adjustment by birds or installation crews.

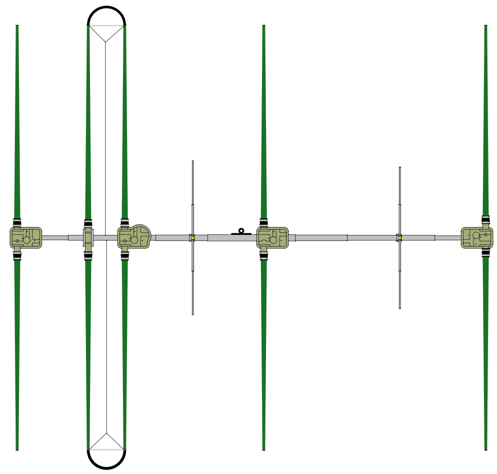
When we claim our Yagi outperforms much larger arrays we are referring to multi-band Yagi's that interlace elements on a long boom and don't use the entire band boom for each band, and additionally have degraded performance due to element interaction. There are many antennas out in the world that are not getting the maximum theoretical gain from their boom! Because we have tunable elements and a very efficient antenna, we are getting close to the maximum gain from our boom. Traps, linear loading and interlaced elements all contribute to this degradation.

## ***Stacking Two Antennas***

Since SteppIR™ antennas are super-tuned mono-banders they stack very well because there are no destructive interactions going on. A good distance is anywhere from 32' to 64', the best being closer to the 32' value. You can also stack them with other non-SteppIR™ antennas and get some reasonably good results. You must ensure that the "hot" side (center conductor) of the driven elements of all the antennas in the stack are on the same side or you will get attenuation instead of gain **(**see **Figure 23 ).** If you want a good demonstration of this phenomenon turn one SteppIR™ 180 degrees to the other in physical direction and run one antenna in the 180 degree reverse mode. You will be amazed at how much it kills the performance. Stacking them as described will result in excellent performance over the entire frequency range (except 6M) because stacking distances aren't that critical, just don't put them too close.

# SteppIR Options

- **40m - 30m  Dipole (loop)**

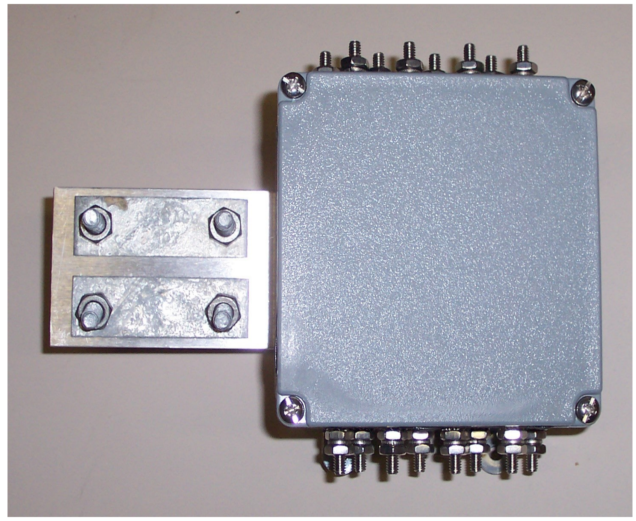


- **"Y" Cable**

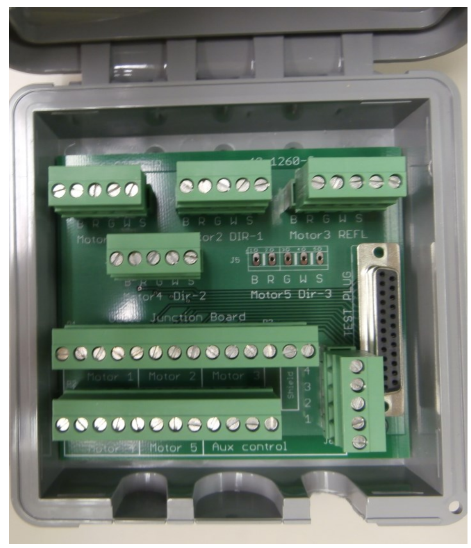
- **Transceiver Interface  cable (Rig Specific)**

- **6m Passive Element Kit**

- **Voltage Suppressor & RF Bypass Unit** ( 16 Conductor)



* **Connector Junction Box**




- **Element Expansion Kit**

| | | |
|---|---|---|
| Dipole | to | 2 Element |
| 2 Element | to | 3 Element |
| 3 Element | to | 4 Element |

### STEPPIR COMMUNICATION SYSTEMS

# 5 YEAR LIMITED PRODUCT WARRANTY

**(as of May 22, 2023; Prior to that date warranty is 2 years)**

Our products have a limited warranty against manufacturers defects in materials or construction for five (5) years from date of shipment. Do not modify this product or change physical construction without the written consent of Fluidmotion Inc, dba SteppIR Communication Systems.

This limited warranty is automatically void if the following occurs: improper installation, unauthorized modification and physical abuse, customer misuse or damage from weather events or natural disasters that are outside of the stated survivability of the product. For wind damage, proof of winds beyond 100 mph must be presented. Lightning or near-lightning events are not covered under this warranty. Driver chip module replacement is not covered under this warranty. This warranty is not transferrable.

**SteppIR Communication System's responsibility is strictly limited to repair or replacement of defective components, at SteppIR's discretion. SteppIR will not be held responsible for any installation or removal costs, costs of any ancillary equipment damage or any other costs incurred as a result of the failure of our products**.

In the event of a product failure, a return authorization is required for warranty repairs. This can be obtained at www.steppir.com. Shipping instructions will be issued to the buyer for defective components, and shipping charges to the factory will be paid for by the buyer. SteppIR will pay for standard shipping back to the buyer. The manufacturer assumes no further liability beyond repair or replacement of the product.

Modification of this product is not authorized and may cause product failure, injury or death.

| Specifications | 4 Element Yagi | 4 Element Yagi with 40/30 |
|---|---|---|
| Boom length | 32 ft / 9.75 m | 32 ft / 9.75 m |
| Boom outside diameter | 1.75 in—2.50 in<br>4.45 cm—6.35 cm | 1.75 in—2.50 in<br>4.45 cm—6.35 cm |
| Longest element | 36 ft / 10.97 m | 39 ft / 11.9 m |
| Turning radius | 24.1 ft / 7.35 m | 24.1 / 7.35 m |
| Weight | 99 lb / 45.0 kg | 106 lb / 48.2 kg |
| Wind load | 9.7 sq ft / 0.9 sq m | 11.7 sq ft / 1.09 sq m |
| *Projected Area | 14.52 sq ft / 1.35 sq m | 18.15 sq ft / 1.67 sq m |
| Adjustable elements | 4 | 4 |
| Power Rating | 3000 watts continuous | 3000 watts continuous |
| Feed points | 1 | 1 |
| Frequency coverage | 13.8—54 MHz | 6.8—54 MHz |
| Control cable | 16 conductor shielded, 22 AWG | 16 conductor shielded, 22AWG |

| 4E Gain / Front-to-rear (by band) | 4E Gain, dBi | 4E Front-to-rear, dB | 4E with 30/40 Gain, dBi | 4E with 30/40 Front-to-rear, dB |
|---|---|---|---|---|
| 40M | NA | NA | 1.8 | NA |
| 30M | NA | NA | 2.1 | NA |
| 20M | 9.5 | 21 | 9.5 | 21 |
| 17M | 10.0 | 20 | 10.0 | 20 |
| 15M | 10.2 | 27 | 10.2 | 27 |
| 12M | 10.4 | 21 | 10.4 | 21 |
| 10M | 10.6 | 11 | 10.6 | 11 |
| 6M | 7.8 | 4 | 7.8 | 4 |
| 6M w/passive opt. | 13.0 | 30 | 13.0 | 30 |

*Projected area is the total perpendicular surface area measured in square feet/square meters, that is exposed to wind. To calculate wind load you always take the largest projected area whether that is from the perspective perpendicular to the boom or perpendicular to the elements. In the case of SteppIR Yagi's, the maximum projected area will always be the sum of the surface area's perpendicular to the Yagi elements. This calculation is a constant number and will not change regardless of EIA specification changes. Do not mistake this projected area calculation as anything more than a datapoint to present to your structural engineer, tower manufacturer or rotator manufacturer so that they can determine what is necessary for your application.

When sizing an antenna to a tower, many factors need to be taken into consideration including, but not limited to: projected area of antenna in square feet or square meters, weight of the antenna and other items on tower, turning radius, element lengths, antenna height, location exposure category, locations three-second gust wind-speed, locations maximum radial ice loading.

Improper specification of an antenna or rotator to a tower can result in product failure, injury or death. SteppIR is not an expert on tower or rotator sizing and for this reason will never offer any recommendation – this specification process is meant for industry professionals such as a structural engineer, tower manufacturer or rotator manufacturer. Please do not attempt to self-specify our products – the information provided by SteppIR is to be utilized by industry professionals only and we will not accept any liability for improperly specified antenna/tower/rotator applications.

COMMUNICATION SYSTEMS



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