Vertical Multi-Band Antenna

DXE-MBV-1

DXE-MBV-1-INS-Revision 0
Table of Contents

Introduction 2
Features 2

Warning 2

Tools Required 3

DXE-MBV-1 Parts List 3

Suggested Parts Not Included 3

Additional Material Needed, Not Supplied 4

Manual Updates 4

Installation 4
Site Selection 4
Mounting Pipe 5

Assembly 5
Tilt Base to Mounting Pipe 6
Vertical Base Section 6
Base Section to Tilt Base 8
Assembling the Vertical Sections 9
Mating the Vertical Sections to the Tilt Base 13

Raising The Vertical 13

Assembling the UNUN Mounting Bracket 14

Installation of UNUN Assembly to Antenna 15

Feedline Connections 17

Tuning the Vertical 19

Guying a Vertical Antenna System 20

Optional Accessory Items 21

Technical Support and Warranty 23
Introduction

The DX Engineering MBV-1 is a 35 foot 8 inch high vertical antenna system. The vertical antenna operates using a customer supplied radial system and good quality outboard tuner. There are no traps, coils or linear loading elements. Designed with 6063 corrosion-resistant aluminum tubing and stainless steel hardware, this antenna is very durable and attractive.

Features
The DXE-MBV-1 vertical antenna system includes the antenna elements, stainless steel clamps, mounting plate assembly, Tilt Base, and stainless steel hardware.

- 35 feet 8 inch overall height
- Patented Tilt Base included
- Rugged base to sleek top for low wind resistance
- No Coils or Traps - Maximum Radiation Efficiency
- Power Handling up to 5 kW - built to last

WARNING!

INSTALLATION OF ANY ANTENNA NEAR POWER LINES IS DANGEROUS

Warning: Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death.

Overhead Power Line Safety

Before you begin working, check carefully for overhead power lines in the area you will be working. Don't assume that wires are telephone or cable lines: check with your electric utility for advice. Although overhead power lines may appear to be insulated, often these coverings are intended only to protect metal wires from weather conditions and may not protect you from electric shock.

Keep your distance! Remember the 10-foot rule: When carrying and using ladders and other long tools, keep them at least 10 feet away from all overhead lines - including any lines from the power pole to your home.
Tools Required
Two 7/16” wrenches, (one of them should be open-end)
5/16”, 3/8”, 7/16”, and 1/2” wrenches or
5/16”, 3/8”, 7/16”, and 1/2” sockets and drive
Medium size flat blade screwdriver or 5/16” nut driver for the element clamps
Medium size flat blade screwdriver or 1/4” nut driver for the smaller element clamps
Tape measure
Felt-tip marker

DXE-MBV-1 Parts List

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilt Base, 3/16” Laser Cut Stainless Steel</td>
<td>1</td>
</tr>
<tr>
<td>DXE-SSVC-2P V-Bolt Saddle Clamp</td>
<td>2</td>
</tr>
<tr>
<td>Tilt Base, Mast Mount Channel</td>
<td>1</td>
</tr>
<tr>
<td>Tilt Base Plate</td>
<td>1</td>
</tr>
<tr>
<td>1/4-20 x 2” HH Bolt, full thread</td>
<td>4</td>
</tr>
<tr>
<td>1/4” Flat Washer</td>
<td>4</td>
</tr>
<tr>
<td>1/4” Split Washer</td>
<td>4</td>
</tr>
<tr>
<td>1/4” Dia. x 1/4” x 1/2” OD Alum. Spacer</td>
<td>4</td>
</tr>
<tr>
<td>1/4-20 Hex nut</td>
<td>4</td>
</tr>
<tr>
<td>1/4” Fender Washer, 1” OD</td>
<td>4</td>
</tr>
<tr>
<td>1/4-20 Flanged Nut</td>
<td>2</td>
</tr>
<tr>
<td>1/4-20 Nyloc nut</td>
<td>4</td>
</tr>
<tr>
<td>3/8” U-Bolt Kits</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4-20 x 1” HH Bolt, full thread</td>
<td>1</td>
</tr>
<tr>
<td>1/4” External Tooth Washer</td>
<td>2</td>
</tr>
<tr>
<td>1/4” Flat Washer</td>
<td>2</td>
</tr>
<tr>
<td>1/4-20 Hex nut</td>
<td>2</td>
</tr>
</tbody>
</table>

Antenna Assembly

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.000 x 0.125” x 36” Tube. Drilled</td>
<td>1</td>
</tr>
<tr>
<td>2.125” x 0.058” x 36” Tube. (Split both ends)</td>
<td>1</td>
</tr>
<tr>
<td>2.000” x 0.058” x 72” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>1.875” x 0.058” x 72” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>1.750” x 0.058” x 36” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>1.625” x 0.058” x 36” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>1.500” x 0.058” x 36” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>1.375” x 0.058” x 36” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>1.250” x 0.058” x 36” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>1.125” x 0.058” x 36” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>1.000” x 0.058” x 36” Tube. (Split one end)</td>
<td>1</td>
</tr>
<tr>
<td>DXE-ECL-10SS - Element Clamp</td>
<td>1</td>
</tr>
<tr>
<td>DXE-ECL-12SS - Element Clamp</td>
<td>1</td>
</tr>
<tr>
<td>DXE-ECL-16SS - Element Clamp</td>
<td>2</td>
</tr>
<tr>
<td>DXE-ECL-20SS - Element Clamp</td>
<td>2</td>
</tr>
<tr>
<td>DXE-ECL-24SS - Element Clamp</td>
<td>2</td>
</tr>
<tr>
<td>DXE-ECL-28SS - Element Clamp</td>
<td>2</td>
</tr>
<tr>
<td>Black Vinyl Cap, 0.9375” ID</td>
<td>1</td>
</tr>
</tbody>
</table>

Feedpoint Connection

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4-20 x 1” HH Bolt, full thread</td>
<td>1</td>
</tr>
<tr>
<td>1/4” External Tooth Washer</td>
<td>2</td>
</tr>
<tr>
<td>1/4” Flat Washer</td>
<td>2</td>
</tr>
<tr>
<td>1/4-20 Hex nut</td>
<td>2</td>
</tr>
</tbody>
</table>

Suggested Parts Not Included

DXE-UN-43 - Multi-Band UNUN for Vertical Antenna Systems
The DXE-UN-43 DX Engineering Multi-Band Vertical UNUN built with proven Maxi-Core® Technology is a matching device specifically designed for application with non-resonant vertical multi-band antennas.

The DXE-UN-43 assures the best efficiency from your vertical multi-band antenna and transmission line/tuner installation. Using the DXE-UN-43 results in minimizing the additional transmission lines losses caused by SWR and allows your antenna to perform to its full potential. The DXE-UN-43 reduces the stresses on your equipment more efficiently than similar competitive products.

By allowing your wide-range tuner to more easily match the antenna’s complex impedance, low frequency performance is improved over other devices currently available.
DXE-UN-43 Features

- Full band coverage on 160-10 meters with an SWR under 1.5:1*
  *Customer supplied wide band tuner required.
- Impedance: 200 ohms to 50 ohms
- Ratio: 4:1
- Power Handling: 2 KW/5 KW Peak - Handles rated power with minimal energy loss so there is no thermal related failure.
- Silver/PTFE SO-239 input connector
- Two 1/4-20 feedpoint connection studs with Stainless Steel Flat Washers, Split Washers, Fender Washers & Wing Nuts
- High impact plastic, weather sealed NEMA spec case: 2-1/2" x 4" x 4" inches (HxWxL)
- Shares the same mounting footprint as other similar competitive products, so it may be easily substituted in existing installations for superior performance.

DXE-UN-BRKT - Mounting Bracket Kit for the DXE-UN-43 UNUN
Custom patented (US Patent No. D597,086) Mounting Bracket including Custom Stainless Steel 90 degree Studded Element Clamps, Aluminum Spacers and Stainless Steel Hardware for mounting the DXE-UN-43 to the DXE Multi-Band Vertical Antenna series.

DXE-TCB-UNFK-WR - Feed Point Connection Kit
One 1" wide x 9" long pre-drilled tinned copper braid for feedpoint connection to the vertical antenna system.

Additional Material Needed but not Supplied:

- **Antenna Mounting** - Steel mounting pipe, up to 2.0" OD, 0.25" wall thickness, 4 feet long. The standard 1-1/2" galvanized water pipe (with its 1.9" OD) is just fine for this application and can usually be found at your local home building supply store.
- **Quik-Set Concrete** - Mounting pipe installation (type depends on your landscape)
- **DXE-P8A - Penetrox™ A** - To ensure good connection for aluminum element sections
- **UMI-81343 - Anti-Seize** compound - used on the threads of Stainless Steel Hardware to prevent galling and aid in proper tightening torque.

Manual Updates

Every effort is made to supply the latest manual revision with each product. Occasionally a manual will be updated between the time your DX Engineering product is shipped and when you receive it. Please contact DX Engineering (DXEngineering@DXEngineering.com) for the latest revision manual.

Installation

Site Selection

Select a mounting location clear from power lines, structures and other antennas by a minimum of 46 feet. **Consider overhead power lines, utility cables and wires**. The vertical should be mounted away from local noise sources or other metallic objects which can re-radiate noise and affect the
tuning, radiation pattern and SWR. Determine the direction you want the antenna to tilt down and make sure there is adequate clearance (at least 46 feet).

**Mounting Pipe**

Use a customer supplied thick-walled galvanized steel mounting pipe at least 4 feet long. This will allow approximately 2 feet or more to be below ground and 20 inches above ground. A thick-walled steel pipe 1-3/4" OD to 2" OD maximum is recommended with a minimum thickness of 1/8" (1/4" preferred) should be used. The standard 1-1/2” galvanized water pipe (with its 1.9" OD) is just fine for this application and can usually be found at your local home building supply store. For permanent mounting, use a post-hole digger to make the hole deep enough to accommodate at least 2 feet of pipe and a couple inches of gravel at the bottom for drainage. Set the mounting pipe on the gravel, use the pre-mix concrete to fill around the pipe, adding water and mixing as you fill or mix the concrete first, then pour in the hole (depends on the type of concrete you purchase). Fill the hole until the concrete is level with the ground around it. Use a level on the mounting pipe as you fill the hole to be sure is vertically straight. Allow to set overnight. Your location, landscape and ground conditions may require different mounting solutions in order to have the steel mounting pipe and the vertical antenna in a secure position.

*Note:* Galvanized steel, rather than aluminum, is much more suitable for mounting in concrete. Aluminum will quickly corrode due to incompatibility with the materials used to make concrete.

**Assembly**

The DXE-MBV-1 shipping boxes contain the vertical tubing sections, an insulated U-channel, two DXE-SAD-200A 2" U-Bolt assemblies, a backing plate, a Tilt Base with two stainless steel V-Clamps, 15 stainless steel clamps, a black vinyl cap, and stainless steel hardware. Carefully un-box the antenna and separate the various parts. Nine of the element sections are 36" long, two are 72” long. The 2" OD base element section is drilled for the feedpoint connection. The base section does not have slit ends. The 2-1/8" OD section is slit on both ends. All the other sections are slit on one end. The vinyl cap for the top element section should be installed after assembly of the vertical is complete.

*Note:* DXE-P8A Penetrox™ A Anti-Oxidant should be used between all antenna element sections. Penetrox™ A is an electrical joint compound to affect a substantial electrical connection between metal parts such as telescoping aluminum tubing or other antenna pieces. It ensures high conductivity at all voltage levels by displacing moisture and preventing corrosion or oxidation.

*Note:* UMI-81343 Never-Seez® or DXE-NSBT8 Anti-Seize should be used on all clamps, bolts and stainless steel threaded hardware to prevent galling and to ensure proper tightening.
Note: The following assembly instructions are based on using a 2" OD Mounting Pipe, with the following options: DXE-UN-43 UNUN, DXE-UN-BRKT Mounting bracket for the UNUN, and DXE-TCB-UNFK-WR Feedpoint kit for the UNUN.

Tilt Base to Mounting Pipe

Install the Tilt Base to the 2" OD mounting pipe using the two DXE-SSVC-2P V-Bolt Saddle Clamps allowing approximately 5-1/2" clearance between the bottom of the tilt base plate to the ground level as shown in Figure 1. The standard 1-1/2" galvanized water pipe (with its 1.9" OD) is just fine for this application and can usually be found at your local home building supply store.

Make sure the Tilt Base is oriented correctly for the direction you wish to tilt the antenna. See Figure 6 which shows the tilt action.

Tighten the clamps evenly so the length of the exposed threads is approximately equal. Any clamp should be tightened evenly from side-to-side with an equal amount of thread above each nut.

Vertical Base Section

The base section is made up of an EXTREN® insulated mounting channel, a mounting plate with hardware, two 2" x 3/8" U-Bolt assemblies and the base antenna section which is 2" OD thick wall, 36" long with a hole drilled at bottom end for the feedpoint hardware.

Using Figure 2, attach the aluminum backing plate to the back of the insulated channel. The base hardware kit contains four 2" hex head bolts, four flat washers, four aluminum spacers, four split washers and four nuts. From the inside of the channel, insert a 2" hex head bolt with a flat washer through each of the middle four holes, through the backing plate. Put on the aluminum spacer, a split washer and a plain hex nut. Tighten firmly, but not enough to crush the insulated channel.
Using the 36" base section tube, install the feedline 1/4-20 x 1" long bolt through the hole in the tube from the inside, so the threads stick out.

Put on a 1/4" star washer, 1/4" flat washer, then a 1/4-20 nut. Tighten securely.

Add another 1/4" star washer, 1/4" flat washer and 1/4-20 nut, but do not tighten. The feedline from the UNUN attaches to this hardware. **Figure 3** shows the completed feedpoint assembly.

Install the lower section to the insulated channel using the two 2" x 3/8" U-Bolts, two saddle clamps, four 3/8" flat washers, four 3/8" split washers, and four 3/8" hex nuts as shown in **Figure 4**. The base section tube should extend 1-3/4" beyond the bottom of the U-bolt clamp.

The feedpoint hardware should be coming out on the left side as you look at the lower section as shown in **Figure 4**.

When tightening, observe the split washers. When they fully seat (flatten out), the clamp is tight enough. Any clamp should be tightened evenly from side-to-side with an equal amount of thread above each nut.
Base Section to Tilt Base

Place the Lower Base Section into the holes of the mounted Tilt Base and loosely install the Tilt Base mounting hardware shown in Figure 5. Leave the flange nuts and Nyloc nuts slightly loose.

Using a wrench or nut driver, securely tighten the two Nyloc nuts at the bottom of the patented Tilt Base. Then loosen them one-half turn each. This will allow proper movement of the Tilt Base while raising or lowering the antenna. It is not necessary to tighten these nuts more securely unless further tilt operation is no longer required. They should not be loosened more than one-half turn at any time.
Test the tilt function to ensure proper clearances. Standing in front of the Tilt Base, lift the antenna base section, slide it to the right, and let it down slightly until the lower outside bolt is resting in the pivot point. Then slowly tilt as shown in Figure 6. Make sure when you are tilting the antenna to **lift, slide to the right, and then tilt**. Be careful to keep the pivot bolt resting in the pivot point. Reverse the process when raising the antenna.

It is important to note that the lower, outside bolt becomes the pivot point while raising or lowering the antenna. This pivot bolt **MUST** be retained in the pivot point. It seems natural to **push** the antenna toward the Tilt Base while raising. **Push up** while raising, but not toward the base since this could cause the pivot bolt to lift out of the slot and allow the mechanism to bind up and bend the lower bolts.

The Tilt Base is not made to support the whole antenna by itself when tilted. When the antenna is tilted over, ensure you have some sort of table, stand, or saw horse to set the antenna on to aid in supporting the weight. When the antenna is in the upright position, ensure the mounting hardware (reference Figure 5) is tightened.

![Figure - 6 - Tilt Action](image)

**Note:** A pair of sawhorses or ladders should be used to support the vertical sections during assembly with the tilt-base and whenever the vertical is tilted down. Do not allow the Tilt Base to support the entire weight of the vertical when horizontal.

**Assembling the Vertical Sections**

**Note:** **DXE-P8A - Penetrox™ A Anti-Oxidant** should be used between all antenna element sections. Penetrox™ A is an electrical joint compound to affect a substantial electrical connection between metal parts such as telescoping aluminum tubing or other antenna pieces. It ensures high conductivity at all voltage levels by displacing moisture and preventing corrosion or oxidation.
When assembling any telescoping aluminum tubing sections you should take the following steps:

1. Make sure the edges are smooth and not sharp. Deburring may be necessary, since burrs and shavings can occur on seams as well as edges. All surfaces need to be completely smooth to allow easy assembly of tubing sections.

   **Caution**
   
   *Aluminum tubing edges can be very sharp. Take precautions to ensure you do not get accidentally cut.*

   The raised particles and shavings that appear when the aluminum tubing is machined are referred to as burrs, and the process by which they are removed is known as deburring.

   Deburring is a finishing method used in manufacturing. Our aluminum tubing is machine cut on both ends and machine slit on one end. Although DX Engineering manufactured aluminum tubing is deburred, you should further assure that there are no ragged edges or protrusions.

   Use the **DXE-UT-KIT-DBR** for this operation.

2. Clean the inside of the aluminum tubing to clear out any dirt or foreign material that would cause the aluminum tubing sections to bind during assembly. Do not use any type of oil or general lubricant between the aluminum tubing sections. Oils or general lubricants can cause poor electrical connections for radio frequencies.

3. Clean the outside of the aluminum tubing to clear any dirt or foreign material that would cause the clamps to malfunction during assembly.

4. The use of **DXE-P8A Penetrox™ A** is highly recommended. Penetrox™ A is an electrical joint compound which effects a substantial electrical connection between metal parts such as telescoping aluminum tubing or other antenna pieces. Using Penetrox™ A assures high conductivity at all voltage levels by displacing moisture and preventing corrosion or oxidation.

5. When assembling the aluminum tubing sections, ensure the area is clear of grass, dirt or other foreign material that could cause problems during assembly of the closely fitted telescoping sections.

   Assemble the vertical sections in an area that is flat and has sufficient room for the length of the antenna during assembly. Lay the tubing out in descending OD sizes. Orient the slits in the tubes toward the top of the antenna. The bottom 2" OD base section has no slits and the feedpoint connection hole at the bottom end. Nine of the sections are 36” long, two are 72” long.
Each tubing section is inserted 4" into the next larger tube. Assembly is easier if the overlaps in the tubing sections are pre-marked. A dark color felt-tip marker works well. Measure and mark 4" from the end of each tube without the slit using a marker so it will be clearly visible.

Locate the 10 Element Clamps.

<table>
<thead>
<tr>
<th>Element Clamp</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DXE-ECL-10SS - Element Clamp</td>
<td>1</td>
</tr>
<tr>
<td>DXE-ECL-12SS - Element Clamp</td>
<td>1</td>
</tr>
<tr>
<td>DXE-ECL-16SS - Element Clamp</td>
<td>2</td>
</tr>
<tr>
<td>DXE-ECL-20SS - Element Clamp</td>
<td>2</td>
</tr>
<tr>
<td>DXE-ECL-24SS - Element Clamp</td>
<td>2</td>
</tr>
<tr>
<td>DXE-ECL-28SS - Element Clamp</td>
<td>2</td>
</tr>
</tbody>
</table>

Refer to Figure 9 for element clamp sizes and locations. Slide the clamps over each section before putting them together. Align the clamps on each section facing the same direction. For final assembly, all the clamps should be positioned very close to the top of each section and the body of the clamp should be positioned between the slits as shown in Figure 7.

Making sure dirt or grass does not adhere to the sections to be joined, insert the marked end of an element tube into the next sized element tube until the 4 inch mark on the element tube is even with the top of the larger element tube section. Position one of the element clamps at the very end, but not hanging over the edge. Make sure the body of the element clamp is positioned between the slits and tighten securely. Repeat the procedure with the marked end of the elements and the other element tubes using one of the element clamps as you work your way up the antenna length. Continue mating the smaller tubes inside the larger ones. Double-check the vertical sections you have just assembled.

Using a felt tip pen, measure and mark the antenna sections as shown in Figure 8. Position one of the DXE-ECL-28SS clamps at the very end, but not hanging over. Make sure the body of the clamp is positioned between the slits and tighten securely. Repeat the procedure for the sections using the Element Clamps as shown in Figure 7.

Reference Figure 9 for the completed antenna assembly.
The top section may be adjusted to vary the length for fine adjustment if necessary.

Overall height is 35 feet 8 inches

Figure 9 - Finished Antenna Assembly

(Drawing not scale)
Mating the Vertical Sections to the Tilt Base

**CAUTION:** Attempting final assembly without proper precaution can be dangerous.
You should have someone help you steady the vertical antenna sections during mating with the base section.

**Note:** A pair of sawhorses or ladders should be used to support the vertical sections during assembly with the Tilt Base and whenever the vertical is tilted down. Do not allow the tilt-base to support the entire weight of the vertical when horizontal.

When the upper element sections are assembled together install the black vinyl cap in place at the top of the smallest element section.

Mate the vertical sections to the base tube section by sliding the bottom 2-1/8” OD element of the vertical over the 2” OD base section element (which was previously mounted to the insulated channel). See Figure 9. The two sections will have a snug fit, so use a small amount of Penetrox A on the bottom section to make the fit easier. Slide the band clamp down to the edge of the bottom section, between the slits, and tighten.

Raising the Vertical

**DANGER:** Make sure you have not inadvertently located the antenna underneath power lines.
Residential power lines are often less than 40' high.
Contact With Any Power or Utility Lines Can Be Lethal!

The tilt-base certainly makes it easier however, this antenna can be challenging to put up the first time or with gusty winds. If you have properly laid out your optional guy system in advance, it will help keep the vertical stable as you raise it – and stop you from going beyond vertical at the apex of the lift.

Make sure the optional guy ropes are in the clear before you begin.

While raising the antenna, keep a constant pulling pressure away from the Tilt Base. This will ensure that the pivot point bolt will not jump out of the pivot slot and cause the tilt mechanism to bind up and bend the bolts.

Starting from the top of the antenna, walk it up slowly using an overhead hand-over-hand motion, maintaining a slow and steady pace.
The antenna mounting channel must be kept in parallel alignment with the tilt-base plate to prevent binding until it is positioned in the tilt-base. Once the antenna is vertical, lift and slide the antenna.
to the left toward the tilt-base mounting pipe to allow the two parts of the tilt-base to line up and drop down into the slots. Lightly tighten the top flange nuts on the tilt-base to hold the antenna.

**Note:** As you raise the antenna to the vertical position, it’s important to maintain the parallel alignment between the antenna mounting channel and the Tilt Base backing plate to minimize binding. Make sure the lower tilt-base bolts are never excessively loose before raising. They should be first tightened securely and then backed off no more than 1/2 turn.

Once the antenna is fully raised, tighten the tilt base hardware (Top: two Nyloc nuts and two flange nuts, Bottom: two Nyloc nuts.)

**Assembling the UNUN Mounting Bracket**

Using the #6 hex head bolts, #6 flat washers, and #6 Nyloc nuts, attach the UNUN to the patented UNUN Bracket with the SO-239 connector facing down. Tighten the Nyloc nuts so they are snug. Do not over tighten since the mounting tabs on the UNUN are plastic.

Attach the custom stainless steel 90 degree studded element clamps to the UNUN Bracket using the aluminum spacers and #10 Nyloc nuts as shown in Figure 10. Snug the #10 Nyloc nuts just to the point that you can still rotate the custom studded element clamps. These Nyloc nuts will be tightened later.
Installation of UNUN Assembly to Antenna Lower Section

The completed UNUN and UNUN Mounting Bracket assembly are mounted to the antenna lower section. To allow easy installation of the UNUN Bracket to the lower base section, open the upper and lower custom studded element clamps as shown in Figure 11.

![Figure 11](image)

Position the UNUN Mounting Bracket so the bottom element clamp is located between the feedpoint hardware and the U-Bolt as shown in Figure 12. Tighten the element clamps to hold the assembly in place.

![Figure 12](image)

A: Clamps open, Clamp Ends inserted to go around Base Section Element
B & C: Clamp Ends go behind Base Section Element
Once in position, re-insert the clamp ends into the worm drive of the clamps and using a flat blade screwdriver or nut driver, snug them up as shown in Figure 13. Note position of lower clamp is between the feedpoint hardware and the U-Bolt.

Figure 13

Position the UNUN so it faces forward. Tighten the Upper and Lower Studded Clamps and Tighten the Nyloc Nuts on the Upper and Lower Clamps.
Feedline Connections

The **DXE-UN-43 UNUN** is attached to the feedline antenna connection using the **DXE-TCB-UNFK-WR** - UNUN Feed Point Connection Kit which contains one pre-drilled copper tinned braid for connection to the vertical antenna system. The braid is 1" wide by 9" in length. Connect the braid from the antenna feedpoint located on the base section of the antenna to the terminal on the **DXE-UN-43 UNUN** closest to the **Red "+"** on the label as shown in **Figure 14**. Do not over tighten the wing nuts. Hand tighten them only, do not use pliers or other tools to over tighten the wing nuts.

Connect the other terminal on the **DXE-UN-43 UNUN** closest to the **Black "-"** on the label to the customer supplied radial system connection point.

**Note:** Ensure the braid connection to the customer supplied radial connection does not interfere with the tilting process.

![Feedline Connections Diagram](image)

**Figure 14**
Your coaxial cable feedline connects direct to the SO-239 connector on the **DXE-UN-43 UNUN**. Weatherproof this coaxial connection using **TRM-06132** - Scotch® Super 33+ and **DXE-3M2155** - 3M Temflex™ 2155 Rubber Splicing Tape.

**Figure 15**
Completed Base Assembly for Reference
Tuning the Vertical Antenna System

The use of a customer supplied, high quality, outboard tuner is required for any multi-band trapless vertical antenna system. The tuner should be capable of tuning the wide range of impedances presented by the antenna and coaxial cable at all the operating frequencies. Tuners of this type generally have a good quality variable roller inductor and at least one large variable capacitor for fine tuning.

There are a number of outboard automatic antenna tuners available that are capable of tuning this type of high performance vertical antenna system.

Tuners which are built into transceivers lack sufficient impedance tuning range for this type of high performance vertical antenna system.

The actual impedance of the multi-band antenna is affected by local conditions, including proximity to structures, other antennas, number of radials, or personal preference for the mounting location. It may be necessary to adjust the top element section slightly longer or shorter, or to vary the length of the coaxial cable, if tuning to best SWR is not achieved with your tuner on all bands.

The performance of this versatile, rugged antenna is highly dependent on the ability of your tuner to deliver a low SWR when tuned. Refer to your tuner user's manual for correct tuner operation.
Guying a Vertical Antenna System

Guying of vertical antennas is always recommended for stability. However, if your area encounters severe wind velocities or icing conditions, simple guying will reduce the possibility of failure. Using the DXE-GUY kits, you can install four guy ropes starting approximately 1/2 the way up the vertical antenna system to ground level. Guying should be tightened just enough to permit the antenna to swing a few inches. The ends of the ropes are tied to the earth anchors that are screwed into the ground at about the same angle as the ropes will be. When using the Tilt Base, position the guy wires as shown below. This will make it easy to raise or lower the antenna and only one guy line needs to be loosened. The other guy lines will help guide the antenna on the way up. Depending on your antenna system, additional guys at points higher on the antenna may be required.

Note: Depending on wind and ice conditions, additional guying may be necessary.
Optional Accessory Items

DXE-UN-43 - UNUN - 4:1, High Power, for use with Non-Resonant Verticals
DXE Engineering high power transmission line transformers with Maxi-Core® Technology allow your antenna to perform to its full potential and reduces the stresses on your equipment more efficiently than similar competitive products. This UNUN is specifically designed for application with 43-foot non-resonant multi-band antennas - assuring the best efficiency from your antenna and transmission line/tuner installation. This results in minimizing the additional transmission lines losses caused by SWR. It can be added to any existing 43-foot antenna installation, or used to replace an older competitive UNUN for a performance increase.

- 1.8 - 30 MHz operating range to cover popular amateur bands.
- Handles rated power with minimal energy loss so there is no thermal related failure.
- Ratio - 4:1
- Impedance: 200 ohms to 50 ohms - optimized for 43 ft. verticals
- Power Level - 2 KW/5 KW PEP
- Frequency Range - 1.8 to 30 MHz
- Weatherproof NEMA enclosure
- Silver / Teflon SO-239 input connector
- 2-3/8” x 4” x 4” inches (HxWxL)

DXE-UN-BRKT - UNUN Mounting Kit for Multi-Band HF Verticals (patented)
This mounting kit allows you to mount a DXE-UN-43 UNUN at the base of any 43-foot Multi-Band vertical antenna. The patented (US Patent No. D597,086) mounting plate may be attached to any 2” OD aluminum tubing element with the studded element clamps supplied. Works with the DXE-UN-43 UNUN, or similar competitive UNUNs and Baluns which use the same size weatherproof NEMA case.

Kit includes:
- High Strength Insulated Mounting Plate
- Custom Studded Stainless Steel Element Clamps
- Stainless steel mounting hardware

DXE-TCB-UNFK-WR - Feed Point Connection Kit, UNUN to Vertical Antenna
This kit consists of one tinned copper braid strap for connection between a DXE-UN-43 UNUN and the feedpoint of the vertical antenna. The strap is the correct length to allow short, low inductance connections - flexible for allowing use of a tilt base with the antenna. The length is 9” from center to center of the preformed 1/4” holes.

- Length: 9” center to center of the 1/4” holes
- Width: 1”
- Thickness: .045”

Width and thickness may vary slightly as the flexible braid is stretched or compressed.
UMI-81343, DXE-NSBT8 - Anti-Seize & Never-Seez®
An Anti-seize compound MUST be used on any Stainless Steel nuts, bolts, clamps or other hardware to prevent galling and thread seizure. Any of these products can be used for this purpose.

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMI-81343</td>
<td>Anti-Seize, 1 oz. Squeeze Tube</td>
</tr>
<tr>
<td>UMI-81464</td>
<td>Anti-Seize, 8.5 oz. Aerosol Can</td>
</tr>
<tr>
<td>DXE-NSBT8</td>
<td>Never-Seez®, 8 oz. Brush Top</td>
</tr>
<tr>
<td>DXE-NMBT8</td>
<td>Never-Seez®, 8 oz. Brush Top, Marine Grade</td>
</tr>
</tbody>
</table>

* These products are limited to domestic UPS Ground shipping only

DXE-P8A - Penetrox™ A Anti-Oxidant - 8 oz. Squeeze Bottle
Use Penetrox™ A electrical joint compound to affect a substantial electrical connection between metal parts such as telescoping aluminum tubing or other antenna pieces. Ensures high conductivity at all voltage levels by displacing moisture and preventing corrosion or oxidation. For Aluminum to Aluminum, Aluminum to Copper, or bare conductors. Not recommended for use with rubber or polyethylene insulated wire.

- 8 oz. squeeze bottle

* This product is limited to domestic UPS Ground shipping only

DXE-KIT-DBR - DX Engineering Tube Deburring Tool Kit
Designed and manufactured in the USA, DX Engineering Tube Deburring Tools feature hardened steel cutting surfaces arranged in a conical shape. Both the interior and exterior of the tool’s cone may be used to smooth the rough edges of the inside and outside of the cut ends of pipe and tubing. Its rotational symmetry allows easy reaming and deburring rough-cut tubing edges with minimum effort. The UT-2125 is usable on all tubing and pipe sizes from 3/8” to 2-1/8” OD. The UT-3500 covers sizes from 1-7/8” to 3-1/2” OD. The complete tool kit, model UT-KIT-DBR, includes both sizes of conical tools, a small hand deburrer and a half round file. DX Engineering Tube Deburring Tools are reversible, so they are ideal to debur both ID and OD of aluminum tubing prior to telescoping the sections together. These tools assure a smooth fit without galling and seizing that can occur with the slightest roughness. Only a couple of revolutions with very light pressure is needed to produce excellent results. DX Engineering Tube Deburring Tools may be used to debur tubing and pipe made of aluminum, fiberglass, copper, steel, plastic pipe, etc.

DXE-3M2155 - 3M Temflex™ 2155 Rubber Splicing Tape.
Conformable self-fusing rubber electrical insulating tape. It is designed for low voltage electrical insulating and moisture sealing applications. For outdoor use, it should be protected from UV deterioration with an overwrap of TRM-06132

TRM-06132 - Scotch® Super 33+.
Highly conformable super stretchy tape for all weather applications. This tape provides flexibility and easy handling for all around performance. It also combines PVC backing with excellent electrical insulating properties to provide primary electrical insulation for splices up to 600V and protective jacketing.
DXE-GUY-Kits - Guying Kits for Vertical Antennas

Some vertical manufacturers indicate their antennas do not need guying. During times of high winds or ice loading, some of these verticals may sustain damage or fail altogether. With the small amount of effort needed to install a four point guy system, the risk hardly seems worth taking. A four-point guying scheme provides the best mechanical advantage to reduce wind stress, regardless of direction. A four point guying system is recommended for use with a DX Engineering Tilt Base, because just one of the guy ropes has to be loosened when you tilt the vertical down. The remaining guys help stabilize the vertical in three directions when being raised. The guying kits are ideal for fixed or portable installations.

| DXE-GUY100-KIT | 4 - Heavy Duty screw-in earth anchors with eyelets |
| DXE-GUY200-KIT | 4 - Heavy Duty screw-in earth anchors with eyelets |
| DXE-GUY400-KIT | 4 - Heavy Duty screw-in earth anchors with eyelets |
| DXE-GUY1000-KIT | 4 - Heavy Duty screw-in earth anchors with eyelets |
| DXE-GUY1000-KIT | 4 - 1000 ft. Roll - UV resistant, 3/32 Double-Braided Dacron Polyester Rope SYN-DBR-94-100 |
| DXE-GUY200-KIT | 4 - 100 ft. Rolls - UV resistant, 3/32 Double-Braided Dacron Polyester Rope SYN-DBR-94-100 |
| DXE-GUY400-KIT | 4 - 100 ft. Rolls - UV resistant, 3/32 Double-Braided Dacron Polyester Rope SYN-DBR-94-100 |
| DXE-GUY1000-KIT | 4 - 100 ft. Rolls - UV resistant, 3/32 Double-Braided Dacron Polyester Rope SYN-DBR-94-100 |

Technical Support

If you have questions about this product, or if you experience difficulties during the installation, contact DX Engineering at (330) 572-3200. You can also e-mail us at: DXEngineering@DXEngineering.com

For best service, please take a few minutes to review this manual before you call.

Warranty

All products manufactured by DX Engineering are warranted to be free from defects in material and workmanship for a period of one (1) year from date of shipment. DX Engineering’s sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by DX Engineering. If DX Engineering’s products are claimed to be defective in material or workmanship, DX Engineering shall, upon prompt notice thereof, issue shipping instructions for return to DX Engineering (transportation-charges prepaid by Buyer). Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing. The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation, damaged from severe weather including floods, or abnormal environmental conditions such as prolonged exposure to corrosives or power surges, or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer’s specifications. In addition, DX Engineering’s warranties do not extend to other equipment and parts manufactured by others except to the extent of the original manufacturer’s warranty to DX Engineering. The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR DX ENGINEERING ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.

©DX Engineering 2014

DX Engineering®, DXE®, DX Engineering, Inc.®, Hot Rodz®, Maxi-Core®, DX Engineering THUNDERBOLT®, DX Engineering Yagi Mechanical®, EZ-BUILD®, TELREX® and Gorilla Grip® Stainless Steel Boom Clamps, are trademarks of PDS Electronics, Inc. No license to use or reproduce any of these trademarks or other trademarks is given or implied. All other brands and product names are the trademarks of their respective owners.

Specifications subject to revision without notice.