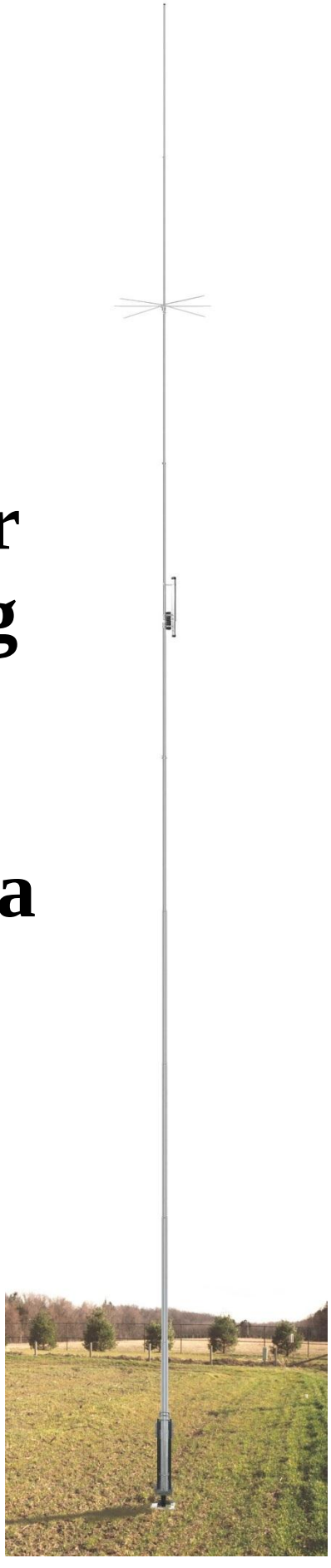
80 and 40 Meter DX Engineering Thunderbolt® Dual Band Vertical Antenna

DXE-8040VA-1

US Patent No. 8,130,168

DXE-8040VA-1-INS Revision 4e



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Introduction

Congratulations on obtaining your DX Engineering **DXE-8040VA-1** Multiband Vertical Antenna! Now you can have a high-performance vertical antenna specifically for the 75/80 meter and 40 meter bands! The DX Engineering 53 to 55-foot Dual Band Vertical Antenna supplies the highest possible performance this side of our mono-band vertical antennas. Perfect for areas where there is no room for individual verticals. Achieve the strongest possible presence at your power level and be competitive!

Covers the whole 40 meter band with one setting!

The 80/75 meter band is tunable down to 3650 kHz center frequency with 300 kHz bandwidth. This means that operation on the CW DX frequencies and DX Phone frequencies is within range of most radio internal tuners - no antenna changes are necessary to switch frequencies!

The optional patented **DXE-7580-THK** CW Optimizer Capacity Hat Kit for 75/80 and 80/40 Antennas is specifically designed to allow the center of resonance to be moved down to the low band edge for dedicated CW ops. The **DXE-7580-THK** consists of hub and 48" adjustable rods. Easy to add to or remove from upper antenna mast with two studded element clamps after lowering antenna.

The DX Engineering **DXE-8040VA-1** is a slow taper 53 to 55-foot high Dual Band Vertical Antenna system. The vertical antenna is specifically designed to operate on 80 meters and 40 meters. Included with this antenna system is a rugged stainless steel pivot fixture for ease of assembly and adjustments. Engineered with 6063 corrosion-resistant aluminum tubing, stainless steel mounting brackets and stainless steel hardware, this antenna is very durable and attractive.

Features

High Efficiency Design

- Massive high efficiency trap assembly - strongest signal possible on both bands
- 5 kW SSB and CW rated - unparalleled reliability
- Instant automatic band switching
- DX Engineering Adjustable Matching Network configures the lowest SWR
- Broad 2:1 SWR bandwidth - 400 kHz on 40m, 300 kHz on 80m
- Lowest possible take-off angle reduces domestic QRM signals

High Strength Pivoting Fixture - US Patent No. 8,130,168

- Ultra-rugged construction starts with 3 inch OD Aircraft Grade heavy wall tubing
- Self supporting - will withstand steady-state winds in excess of 50 mph without guying (guying required under extreme wind speed conditions)
- Extremely high strength heavy wall tubing made to DX Engineering specifications
- Massive Extren® channel insulator

The optional **DXE-VRW-1** Manual Winch for easy one-person raising and lowering of the antenna is available from DX Engineering. You can move the **DXE-VRW-1** winch between similar antennas in a multi-antenna installation.

This antenna system requires a heavy duty mounting pipe. Recommended installation should provide up to 3" OD heavy wall galvanized steel pipe set in concrete. Schedule 80 pipe that is called 2-1/2" has an outside diameter of 2.875" is recommended. The mounting pipe should extend 36" above ground level. Depth of the mounting hole and amount of concrete is dependent on local soil type, condition and antenna guying.

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 9/16" wrenches, (one of them should be open-end)
One 7/16" open end wrench
Two 3/4" wrenches
Medium size flat blade screwdriver or 5/16" nut driver for the element clamps
Tape measure
Felt-tip marker
Small Phillips Head Screwdriver

Manual Updates and Information

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 check the DX Engineering web site (www.dxengineering.com) for the latest revision manual.

Please - Take the time to read the entire manual before you start assembly. There are plenty of pictures and drawings to see, and if you read the entire manual first, you'll get a better feel for the overall construction methods described. Assembly is not difficult, but there are a number of parts that must go together in a certain sequence to make assembly easier.

Installation Sequence

1. Site Selection
2. Mounting Pipe
3. Coaxial Cable to Mounting Pipe
4. Radial System
5. Pivot Base Assembly (US Patent No. 8,130,168)
6. Mounting Pivot Base to Mounting Pipe
7. Antenna Assembly
8. Tuning

Site Selection

Select a mounting location clear from power lines, structures and other antennas by a minimum of 65 feet (55 + 10 ft. safety rule). **Consider overhead power lines, utility cables and wires**. The further away the vertical is mounted from local noise sources or other metallic objects, which can re-radiate noise and affect the tuning, radiation pattern and SWR, the better. Determine the direction you want the antenna to pivot and make sure there is adequate clearance (at least 65 feet).

Mounting Pipe

Use a customer supplied 2-1/2" schedule 80 galvanized steel thick-walled mounting pipe *at least* 7-1/2 feet long. The 2-1/2" schedule 80 galvanized steel pipe will have an outside diameter of 2.895". This will allow 4-1/2 feet below ground and 3 feet above ground.

Some manufacturers use the term DOM (drawn over mandrel) which will give you a true OD dimension. Other types of mounting pipe may be used but due to lateral strength needed ensure the mounting pipe is strong enough. The material most available is ASTM A513 Type 5 which is a 1020 material. Some pipe suppliers list the material as either 1020 or 1026. Type 1020 has the following properties:

ASTM A513 (1020): Up to 2-3/4" OD with maximum wall thickness of 0.125"
Tensile: 80,000 PSI. Yield: 70,000 PSI. Elongation in 2": 15%. Rockwell Hardness: B80

ASTM A513 (1020): Over 2-3/4" OD with wall thickness heavier than 0.125"
Tensile: 70,000 PSI. Yield: 60,000 PSI. Elongation in 2": 20%. Rockwell Hardness: B80

The following sizes of 65,000 PSI yield tubing are also suggested:

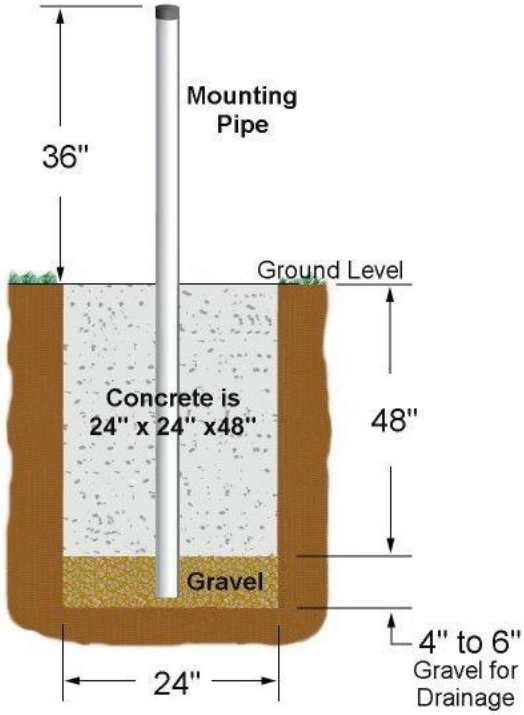
2.50" OD x 0.375" wall thickness
2.50" OD solid bar
3.00" OD x 0.25" wall thickness

Depending on your geographic location, various dealers should be able to supply the mounting post you specify. The following dealers can supply DOM tubing: (Other dealers in your area may be a better choice.)

On Line Metal Store: www.onlinemetals.com
Speedy Metals: www.speedymetals.com
Metals Depot: www.metalsdepot.com

Note: DX Engineering does not recommend or endorse any specific vendor.

This mounting pipe must be permanently mounted in the ground, preferably in a concrete base 2 feet by 2 feet by 4 feet deep (with gravel below for drainage). The antenna system requires this type of mounting to help withstand the lateral forces present on the antenna during wind conditions and when operating the pivot function. Make the hole deep enough to accommodate at least 4 feet of pipe and 4 to 6 inches of gravel at the bottom for drainage. Set the mounting pipe on the gravel, use the concrete to fill around the pipe per the concrete instructions. 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 the mounting pipe is vertically straight.



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.

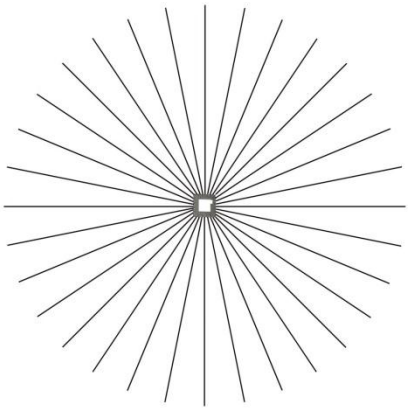
Note: Galvanized steel, rather than aluminum, is much more suitable for mounting in concrete. Aluminum will quickly corrode due to incompatibility with the materials used to make concrete.

Coaxial Cable to Mounting Pipe

The coaxial cable should be routed to the base of the antenna system and be buried below the radial system. PVC Conduit pipe may be used to house the coaxial cable. Bury the cable 6" to 12" below ground level.

Radial System

The use of a radial system is a key requirement for a high performance quarter wave vertical antenna system. With a vertical antenna system, the radials are the second half of the antenna. The radials contribute to the radiation efficiency of the entire vertical antenna system.



At a minimum, 32 radials, each 65 feet long, should be used with this antenna. **DXE-RADW** Radial Wire, a 14 gauge stranded copper with a black relaxed PVC insulation wire is suggested for the best results.

The wire radials should placed as symmetrically as possible straight from the feedpoint around the vertical antenna and spaced evenly, regardless of how many radials are used. Do not cross or bunch any radial wires as this nullifies their effectiveness. If you have limited space, put in as many straight radials as you can. The radials must be connected to the shield of your feedline. The **DXE-RADP-3** Stainless Steel Radial Plate is an ideal optional item which provides an excellent system for attaching radial wires to your vertical antenna system feedpoint.

Radial wires can be laid on the roots of the grass using **DXE-STPL** Radial Wire Anchor Pins to hold them down. Using enough staples will ensure the wires will not be snagged by mowers, people, or animals. Grass will quickly overgrow the radials and it will be virtually impossible to see them. An article describing this process is available on the DX Engineering website in the **Tech Info** section. Radials can also be buried just under the surface by using a power edger to make a slit in the soil.

Assembly Notes

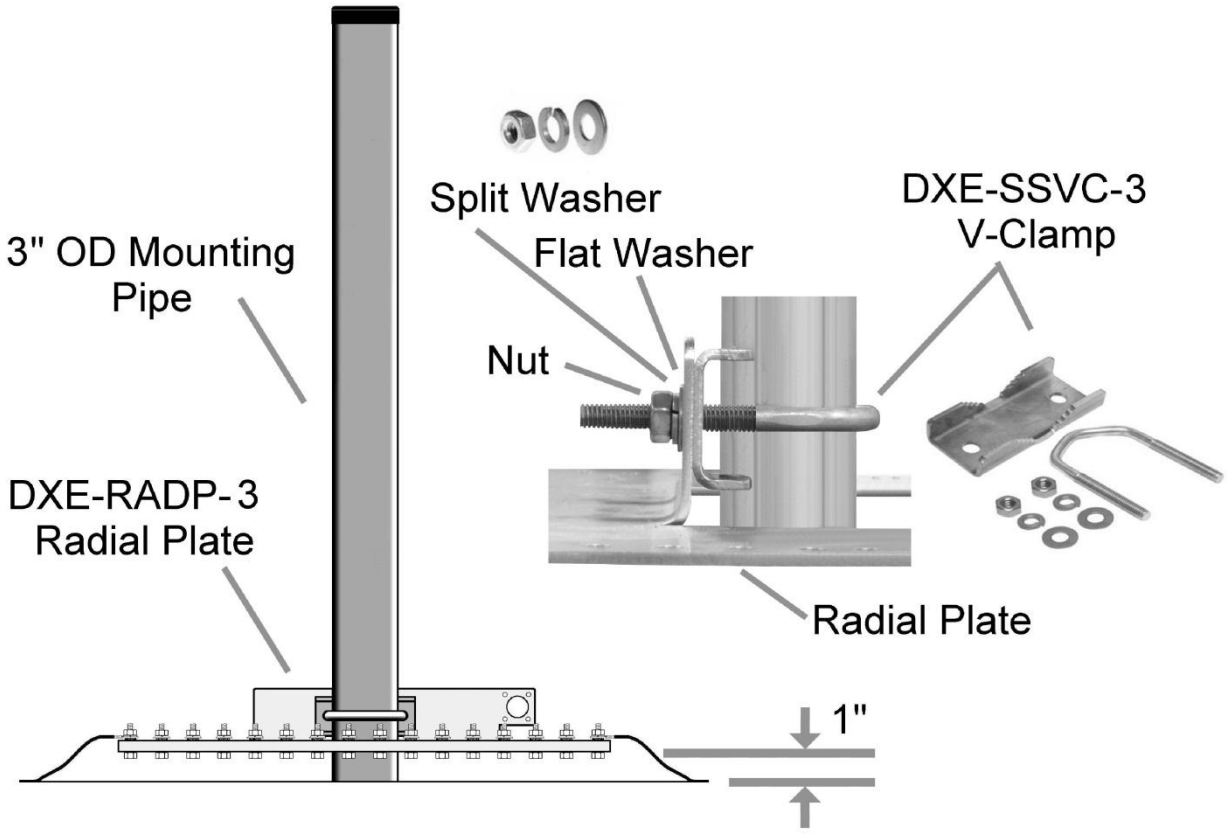
Note: ***DXE-P8A Penetrox™ A Anti-Oxidant should be used between all antenna element sections. Penetrox™ A is an electrical joint compound to affect a substantial electrical connection between metal parts such as telescoping aluminum tubing or other antenna pieces. It ensures high conductivity at all 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 customer supplied 2.895" OD Mounting Pipe, with the optional DXE-VR-1 Manual Winch, optional DXE-RADP-3 Radial Plate, optional DXE-363-SST Bulkhead Connector and the optional DXE-7580-THK Capacity Hat Assembly.

Radial Plate to Mounting Pipe

Place the optional **DXE-RADP-3** Radial Plate over the 2.895" OD mounting pipe. Connections to the antenna will be made via the optional **DXE-363-SST** bulkhead fitting SO-239 socket connector. The **DXE-RADP-3** Radial Plate comes with 20 sets of stainless steel hardware for mounting the radial wires. It is suggested that 32 radial each 65 feet long be used, therefore additional **DXE-RADP-1HWK** Radial Plate Wire Attachment Hardware Kits will be required.



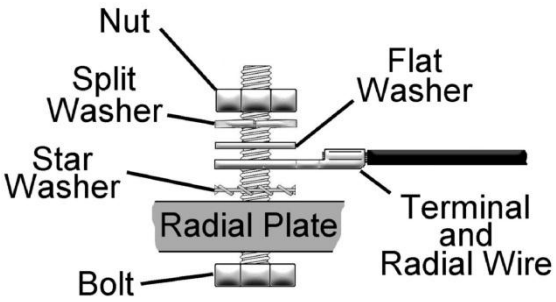
Optional DXE-RADP-3 Radial Plate Mounted to a 3" OD Mounting Pipe

Attaching Ground Radial Wires to the Radial Plate

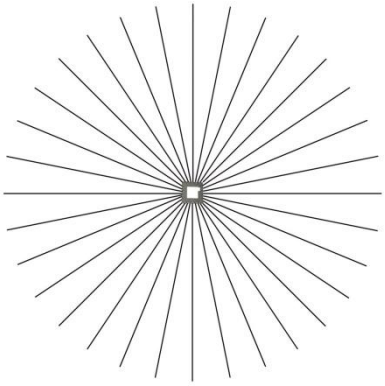
Using the 20 sets of supplied 1/4" stainless steel hardware (Bolt, Star Washer, Flat Washer, Split Washer, Nut) connect the optional ground radial wires to the **DXE-RADP-3** Radial Plate as shown below. Additional hardware kits are available (**DXE-RADP-1HWK**) that contain 20 sets of Radial Plate Hardware.

There are optional DX Engineering Radial Wire Kits available. **DXE-RADW-500K/BD** contains a 500 foot spool of 14 gauge copper stranded wire with black PVC insulation, 20 Terminal Lugs and 100 Steel or Biodegradable Lawn Staples. The **DXE-RADW-1000K/BD** Radial Wire Kit contains a 1,000 foot spool of 14 gauge copper stranded wire with black PVC insulation, 40 Terminal Lugs and 200 Steel or Biodegradable Lawn Staples. **RADW-20RT, -32RT** or **-65RT** contain 20 each radial wires with 1/4" terminal attached. These kits come in 20 Ft, 32 Ft or 65 Ft lengths.

Depending on the number of radial wires used, space them out evenly around the Radial Plate. The Radial Plate will accommodate up to 60 radial wires (60 laser drilled holes), or up to 120 radials if doubled up.

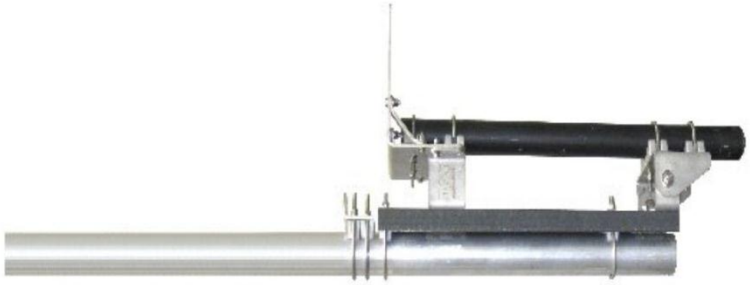


Radial Wire Hardware Installation

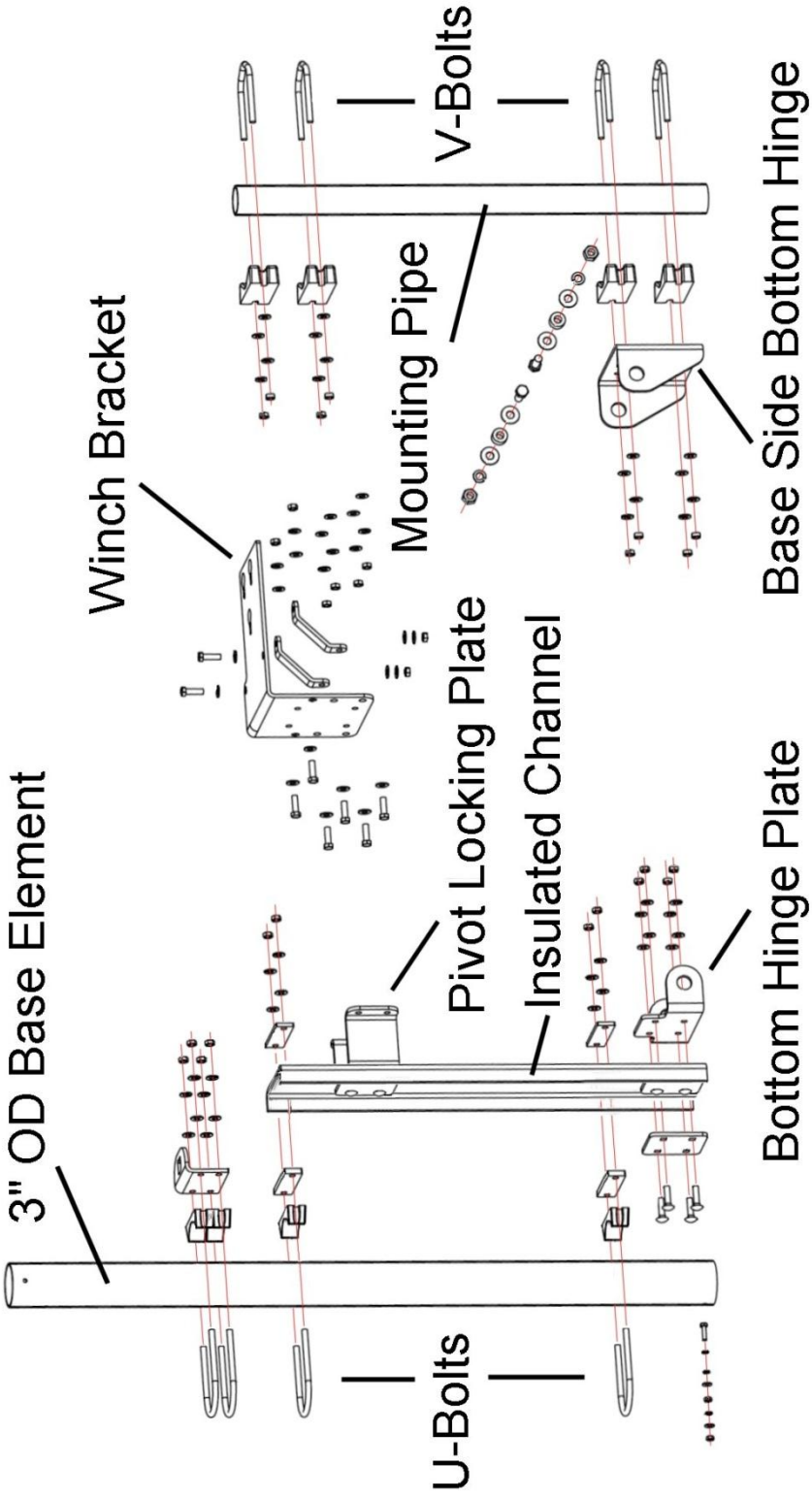


Radial Wire Pattern

Overall Pivot Base
(US Patent No. 8,130,168)
Assembly Drawing



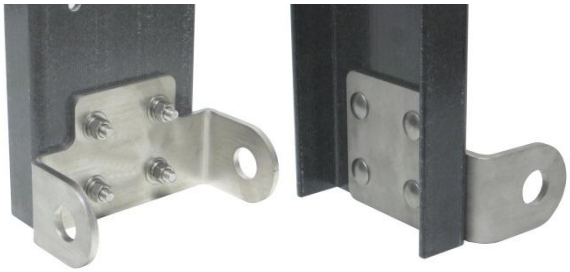
The exploded view drawing is for reference and shows the overall Pivot Base Assembly.

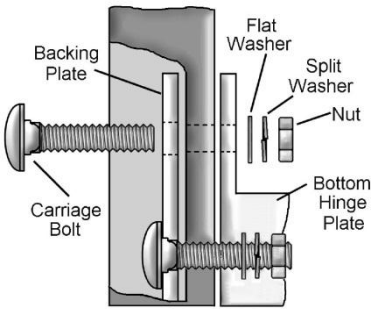


Pivot Base and Lower Antenna Assembly

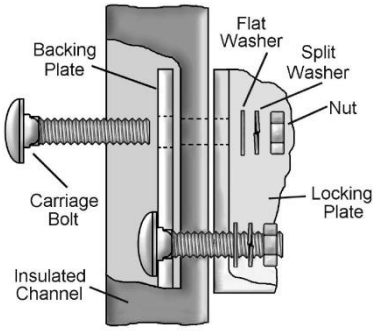
1. Locate the heavy duty Extren® insulated channel. There are 12 holes drilled in the insulated channel. The top of the insulated channel is identified by two holes located very near the top side.

2. Locate the stainless steel bottom hinge plate, backing plate, four carriage bolts, four 3/8" flat washers, four 3/8" split lock washers and four 3/8" hex nuts. Assemble the bottom hinge to the bottom of the heavy duty insulated channel as shown below.

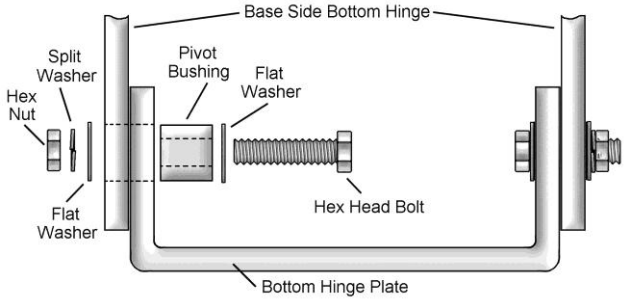




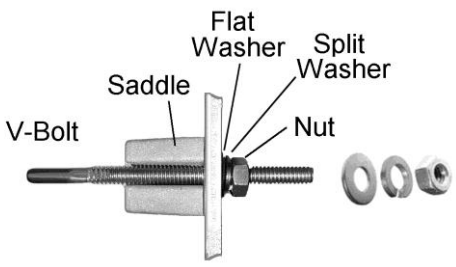
3. Locate the stainless steel pivot base locking plate, backing plate, four carriage bolts, four 3/8" flat washers, four 3/8" split lock washers and four 3/8" hex nuts. Assemble the pivot base locking plate to the top of the heavy duty insulated channel as shown below.



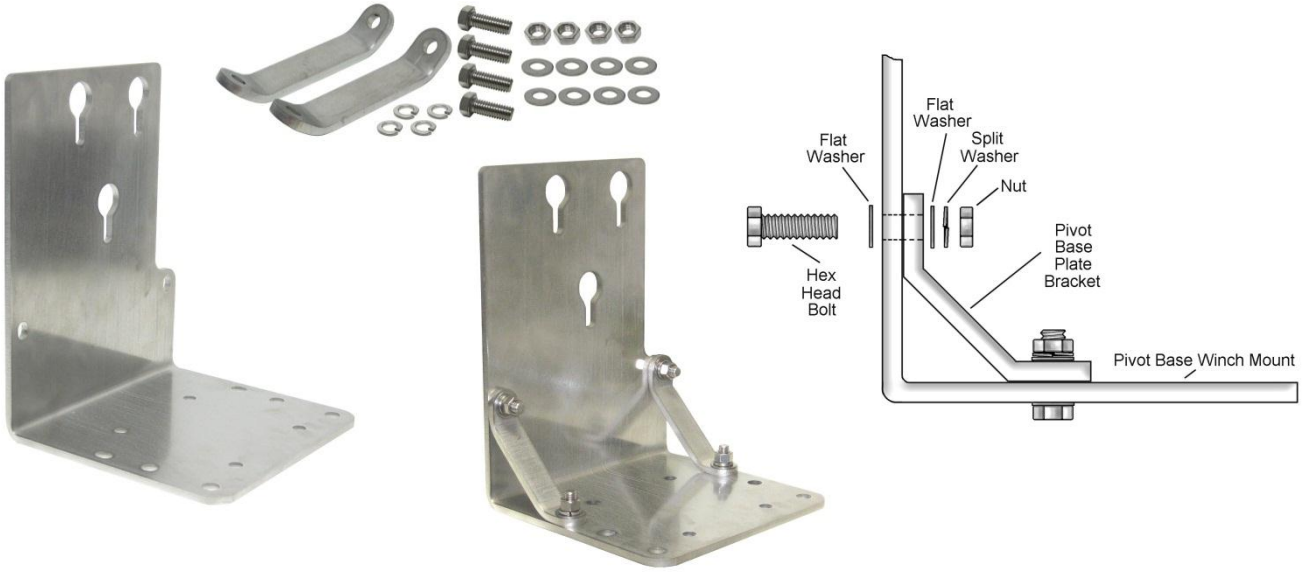
4. Locate the stainless steel base side bottom hinge, two 1/2-13 x 1-1/4" long stainless steel hex head bolts, two pivot bushings, four 1/2 x 1-1/4" stainless steel flat washers, two 1/2" stainless steel split lock washers, and two 1/2-13 stainless steel hex nuts. Assemble the base side hinge plate to the bottom hinge plate as shown below.



5. Locate two V-Saddle blocks, two stainless steel V-Bolts, four stainless steel 3/8" flat washers, four stainless steel 3/8" split lock washers and four stainless steel 3/8-16 hex head nuts. Loosely assemble (one or two threads beyond the end of the hex nuts) the two V-Bolts to the stainless steel base side bottom hinge as shown below. The V-Bolts will be tightened in a later assembly step.

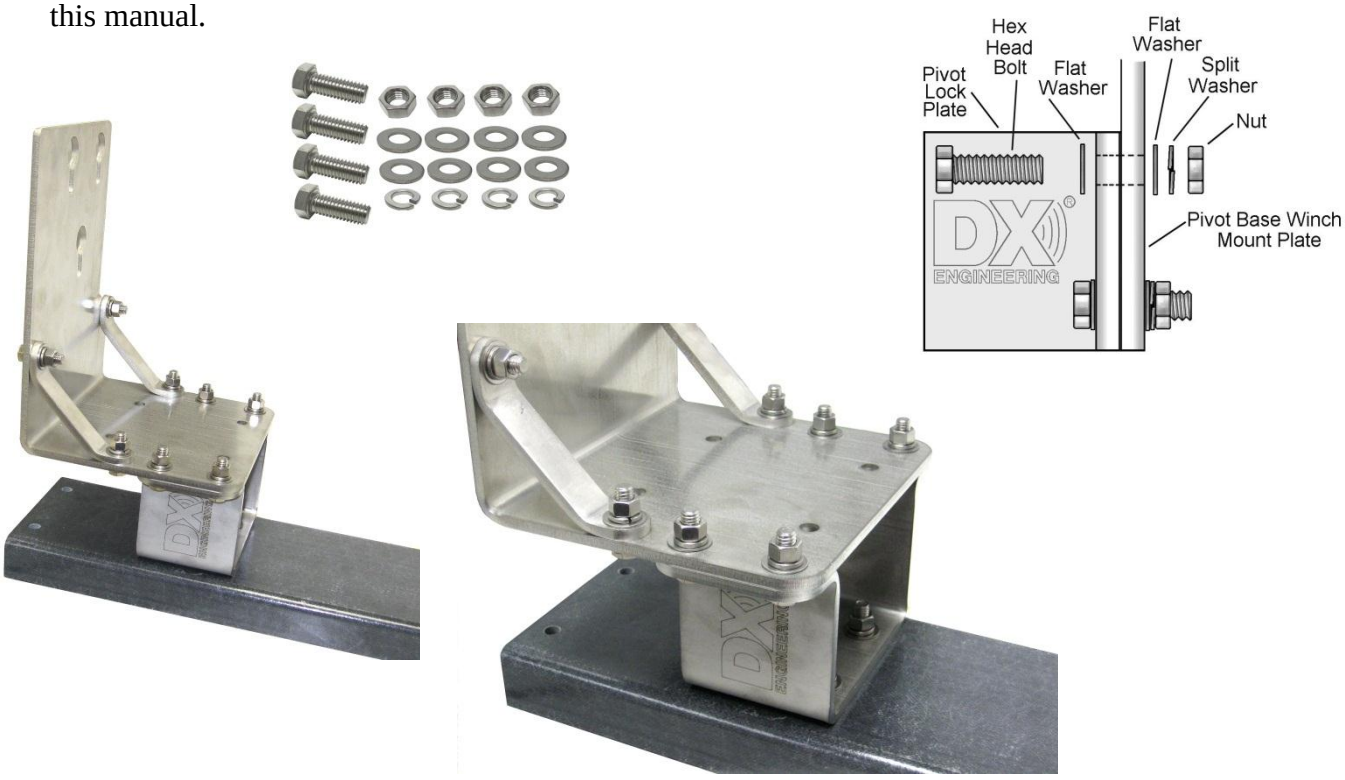


6. Locate the stainless steel Pivot Base Winch Mount, two stainless steel Pivot Base Plate Brackets, four 3/8-16 x 1-1/4" long stainless steel hex bolts, eight stainless steel 3/8" flat washers, four stainless steel 3/8" split lock washers and four stainless steel 3/8-16 hex nuts. Assemble the Pivot Base Plate Brackets to the Pivot Base Winch Mount as shown below.

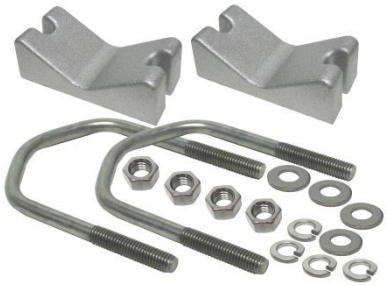


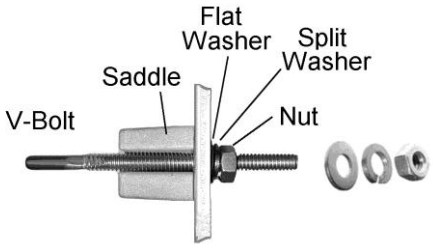
7. Locate four 3/8-16 x 1-1/4" long stainless steel hex bolts, eight stainless steel 3/8" flat washers, four stainless steel 3/8" split lock washers and four stainless steel 3/8-16 hex nuts. Mount the Pivot Base Winch Mount assembly to the stainless steel Pivot Base Locking Plate.

   Note: These four bolts are removed when using the pivoting function as described later on in this manual.

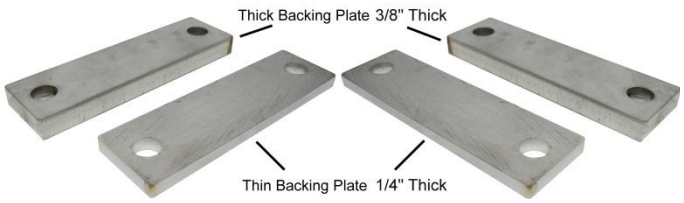


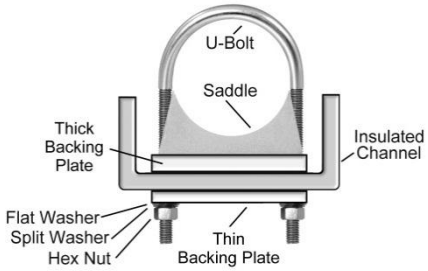
8. Locate two V-Saddle blocks, two stainless steel V-Bolts, four stainless steel 3/8" flat washers, four stainless steel 3/8" split lock washers and four stainless steel 3/8-16 hex head nuts. Loosely assemble (one or two threads beyond the end of the hex nuts) the two V-Bolts to the stainless steel Pivot Base Winch Mount as shown below. The V-Bolts will be tightened in a later assembly step.



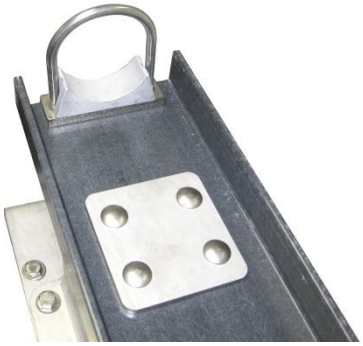


9. Locate two thick stainless steel Backing Plates, two thin stainless steel Backing Plates, two U-Bolt Saddle blocks, two stainless steel U-Bolts, four stainless steel 3/8" flat washers, four stainless steel 3/8" split lock washers and four stainless steel 3/8-16 hex head nuts.





The two Thick Backing Plates (3/8”) are located next to the U-Bolt Saddles on the inside of the insulated channel. The two Thin Backing Plates (1/4”) are used on the rear side of the insulated channel.



Top of Insulated Channel
Showing U-Bolt installed
The Thick Spacer is on the front side
The Thin Spacer is on the rear side

Rear and Front views showing the U-Bolt located at the Bottom of the Insulated Channel
The Thick Spacer is on the front side, the Thin Spacer is on the rear side

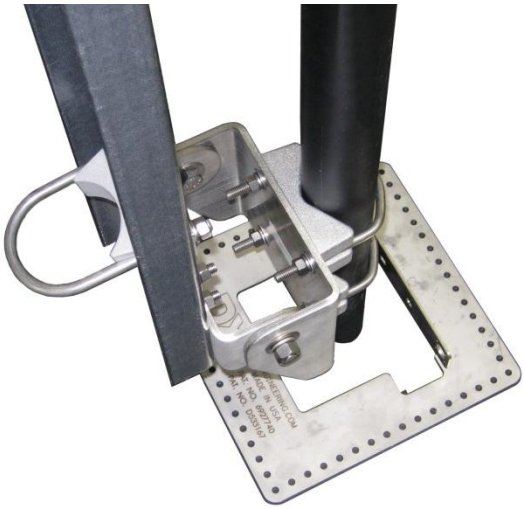
Loosely assemble (one or two threads beyond the end of the hex nuts) the two U-Bolts and associated hardware to the insulated mounting channel as shown above. The U-Bolts will be tightened in a later assembly step.

10. Move the four V-Bolts out as far as they will go (these were put on loosely in steps 2 and 8).

    Slide the entire assembly onto your mounting pipe. You want approximately 1 inch clearance from the top of your mounting pipe to the bottom side of the winch mounting plate.

    Position the base fixture in the position you pre-selected for the pivoting direction. Ensure the assembly is perfectly vertical, not twisted from top to bottom at an angle.

    Tighten the V-Bolt clamp hardware 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.



11. Locate the 3" OD x 72", 0.120" wall thickness antenna bottom element section. There are 5 holes drilled in this element section.

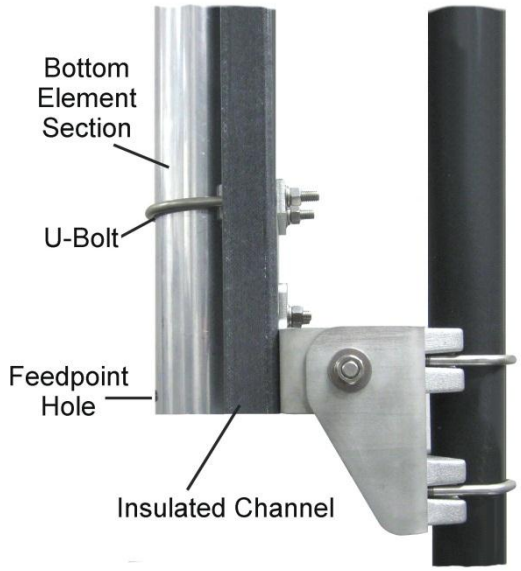
    One drilled hole at the bottom is for the feedpoint hardware.

    Four drilled holes at the top are used for mating to the next antenna element section.

    Loosen the previously installed U-Bolts (Step 9). Insert the 72" Antenna Bottom Element Section into the antenna base section through the upper and lower U-Bolts.

    Position the single feedpoint hole at the bottom facing outward as shown in the picture to the right.

    The bottom of the 3" OD element tube should be even with the bottom of the insulated channel as shown below.



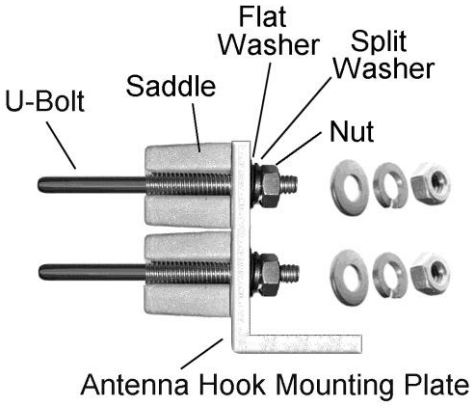
Side View

Front View

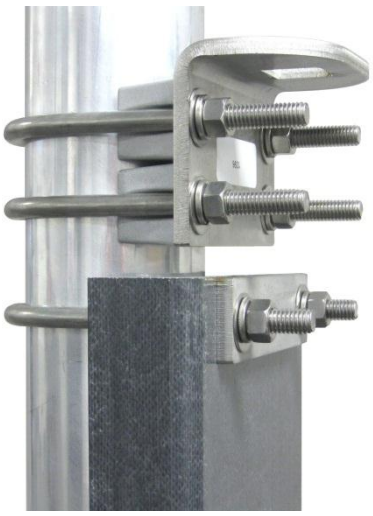
    Tighten the lower and upper U-Bolt clamps hardware evenly so the length of the exposed threads is approximately equal. Any clamp should be tightened evenly from side-to-side with an equal amount of thread above each nut.

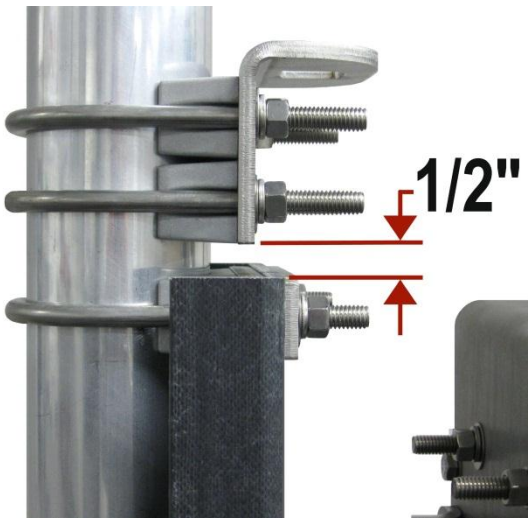
12. Locate the stainless steel Antenna Hook Mounting Plate, two U-Bolt Saddle blocks, two stainless steel U-Bolts, four stainless steel 3/8" flat washers, four stainless steel 3/8" split lock washers and four stainless steel 3/8-16 hex head nuts.

    Loosely assemble (one or two threads beyond the end of the hex nuts) the two U-Bolts and associated hardware to the antenna hook mounting plate as shown below. The U-Bolts will be tightened in the next assembly step.



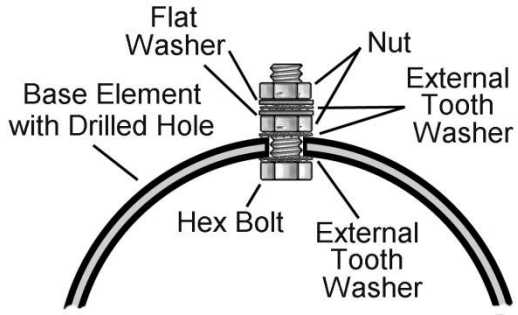
13. Loosen the U-Bolts enough to slide the Antenna Hook Mount assembly over the 3" OD antenna lower element on the base assembly. Position the antenna hook mount approximately 1/2" above the insulated channel as shown below.





14. Tighten the two U-Bolt clamps hardware 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.

15. Locate the 1/4-20 x 1" long stainless steel hex bolt, three 1/4" stainless steel external tooth lock washers, two 1/4" stainless steel flat washers and two stainless steel 1/4-20 hex nuts. Install the feedpoint hardware at the bottom of the 3" OD bottom element in the pre-drilled hole as shown below.



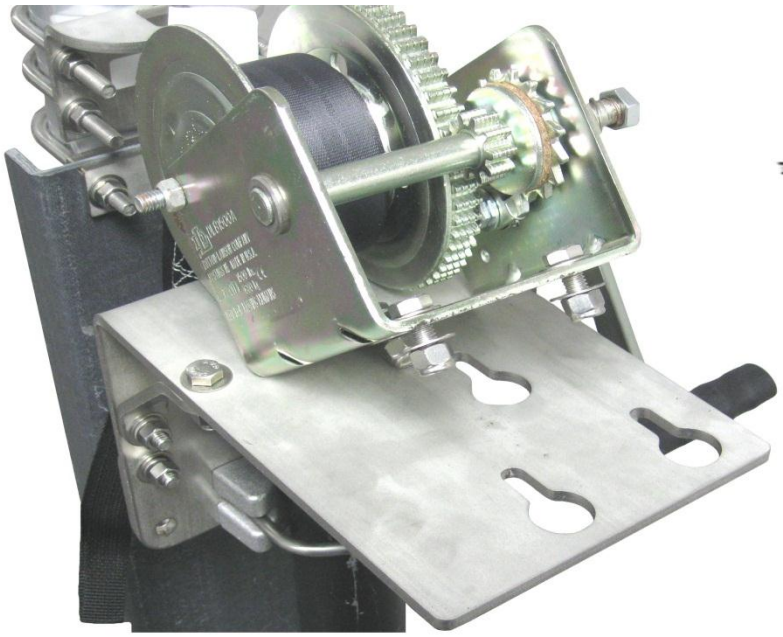
Views showing the Feedpoint hardware installed

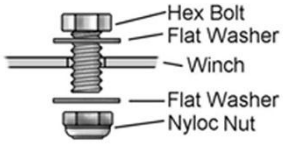
Mounting and using the Optional DXE-VRW-1 Manual Winch

1. Follow the instructions included with the optional **DXE-VRW-1 -** Manual Winch Add-On Kit to prepare the Manual Winch for installation on the antenna base assembly.

2. Included with optional **DXE-VRW-1 -** Manual Winch Add-On Kit is the stainless steel hardware for mounting the winch on the pivot base assembly. The hardware includes three 3/8-16 x 1" long stainless steel hex bolts, six stainless steel 3/8-16 flat washers and three 3/8-16 Stainless Steel Nyloc Nuts.

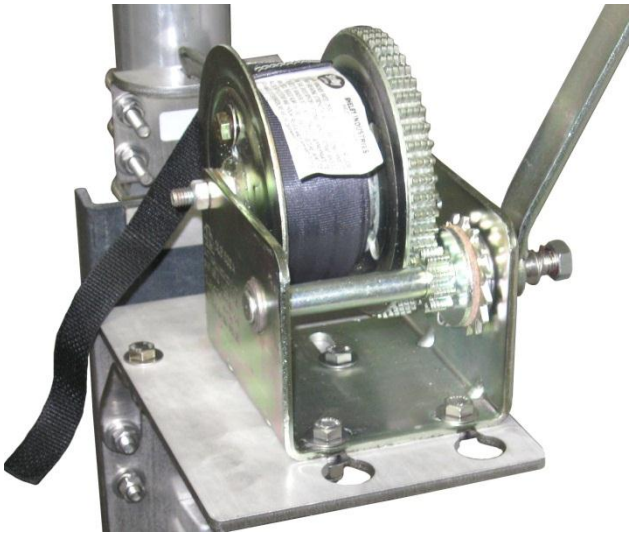
Loosely install the three sets of stainless steel hardware on the manual winch as shown below.

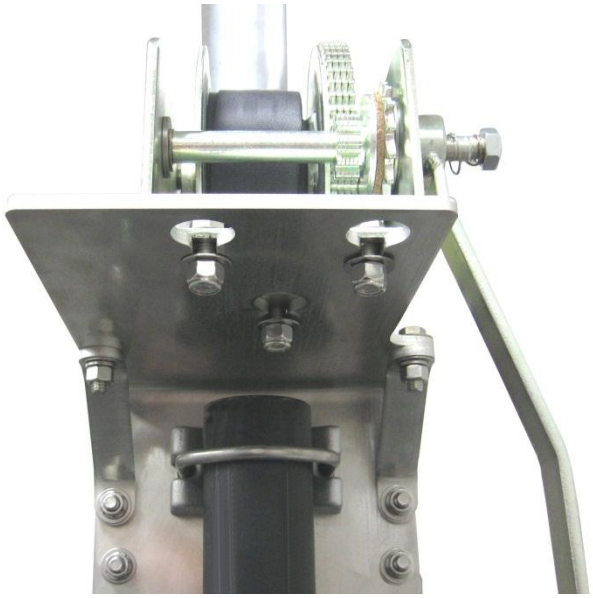




The hardware does not have to be removed from the manual winch to either install or remove the manual winch from the winch mounting plate.

There are three holes with slots in the mounting bracket. The flat washers will fit through the large holes. Once in place, push the winch inward (toward the antenna elements) allowing the three bolts to go into the three slots. Tighten the hardware to hold the winch in place.

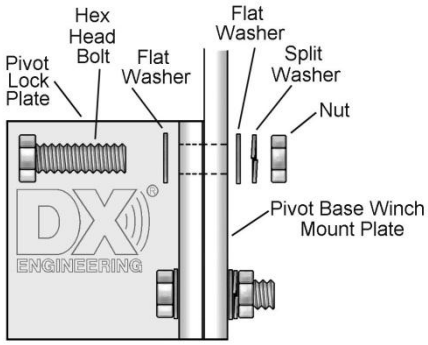


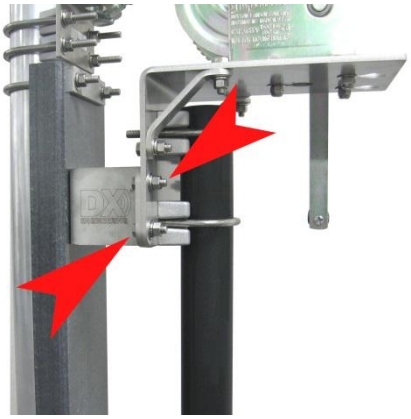


Connect the Hook from the manual winch strap to the Antenna Hook Mount as shown below.

To remove the winch, simply reverse this sequence.

3. To lower the antenna, ensure the winch hook is in the Antenna Hook Mount. Remove the four bolts and hardware that hold the Pivot Lock Plate to the Pivot Base Winch Mount Plate. You can now use the winch to pivot the antenna downward.





Four Bolts to be removed to allow for pivoting

4. Turn the crank on the manual winch to lower, or raise the antenna. After raising the antenna completely, make sure you replace the four bolts that were removed in step 3. The manual winch should be removed and stored when not in use to protect the gears and web strap from weather and environmental effects.

Note: *Sawhorses, chairs, or ladders should be used to support the vertical sections during assembly with the pivot base and whenever the vertical is tilted down to allow easy maintenance, or when making adjustments.*

General Information about Aluminum Tubing

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.*

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-22166 Slim Grip Deburring Tool**, or the **DXE-22600 Deburring Tool with Extending Handle and Extra Blades** 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.

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*

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.*

The vertical sections of the **DXE-8040-VA-1** consists of ten sections of custom engineered 6063 corrosion-resistant aluminum tubing ranging in size from 3" OD to 1" OD. The 3" OD section has already been mounted in the Pivot Base Assembly.

A special custom insulator is installed which electrically isolates the 80 meter and 40 meter sections of the antenna. Around this insulator, the heavy duty pre-tuned 80/40 trap assembly is installed.

Topping off the installation of the vertical sections will be the optional patented **DXE-7580-THK CW** Optimizer Capacity Hat Kit for 75/80 and 80/40 Antennas which is specifically designed to allow the center of resonance to be moved down to the low band edge for dedicated CW ops. The **DXE-7580-THK** consists of hub and 48" adjustable rods. Easy to add to or remove from upper antenna mast with two studded element clamps after lowering antenna.

It is suggested that the vertical elements be laid out in a line according to size on a flat surface for ease of assembly. Once all the parts are assembled, the vertical sections should be supported with either saw horses, chairs or other suitable structures for assembly of the 80-40 trap and capacity hat.

When all the vertical element sections are assembled, they will be mated to the Pivot Base Assembly.

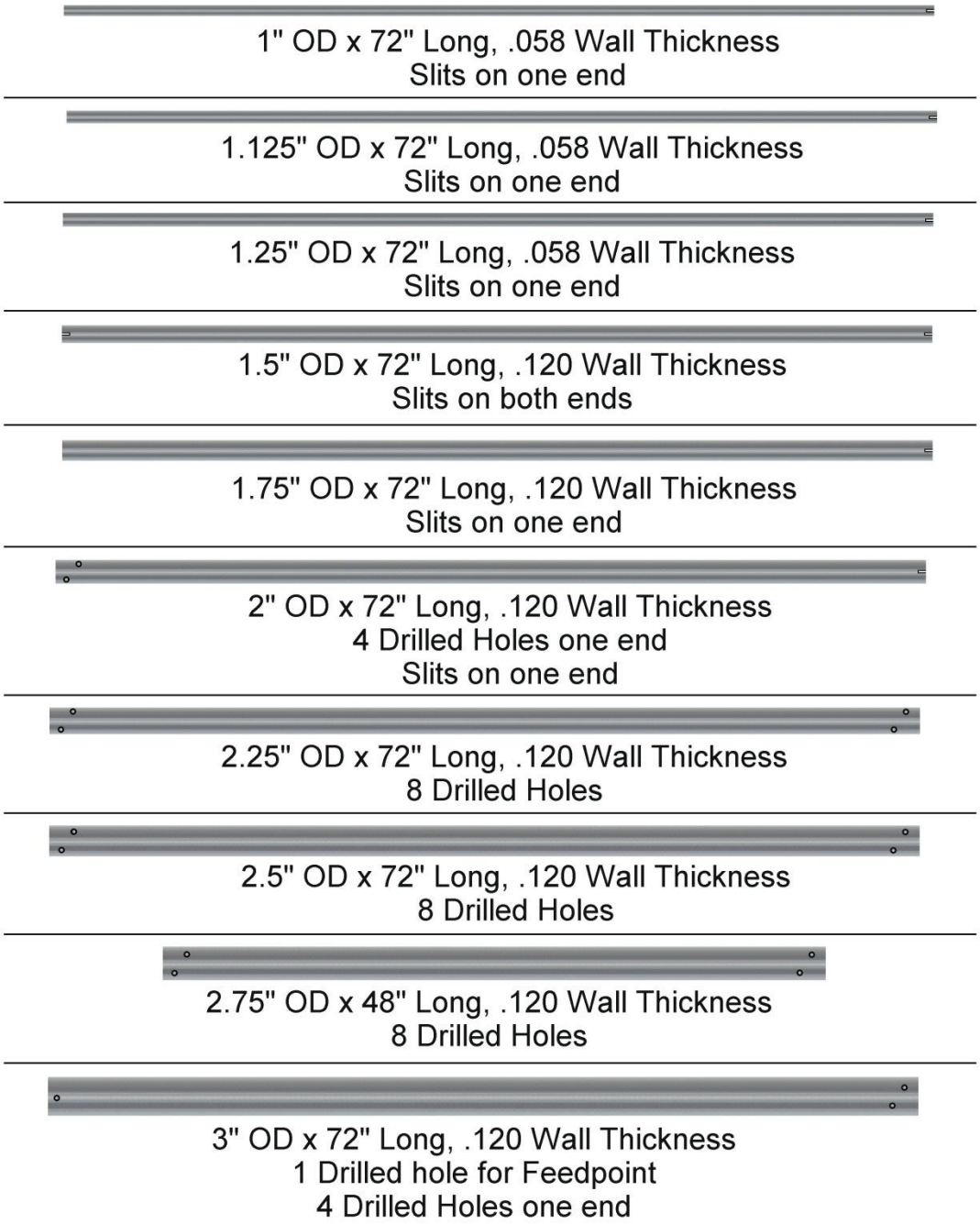
1. Locate the parts needed for the vertical element assembly:

Vertical Elements Assembly Parts List

QTY	Description
1	2.75" OD x 48" long, 0.120" wall, 8 drilled holes
1	2.5" OD x 72" long, 0.120" wall, 8 drilled holes
1	2.25" OD x 72" long, 0.120" wall, 8 drilled holes
1	2" OD x 72" long, 0.120" wall, 4 drilled holes, slits on one end
1	1.75" OD x 72" long, .120" wall, slits on one end
1	1.5" OD x 72" long, 0.120" wall, slits on both ends
1	1.25" OD x 72" long, 0.058" wall, slits on one end
1	1.125" OD x 72" long, 0.058" wall, slits on one end
1	1" OD x 72" long, 0.058" wall, slits on one end
1	Black Vinyl Cap for 1" OD Tube
1	80/40 Heavy Duty Insulator, 1.25"/1.5" DIA x 9" long

QTY	Description
3	DXE-ECL-12SS Stainless Steel Element Clamp
3	DXE-ECL-16SS Stainless Steel Element Clamp
2	DXE-ECL-20SS Stainless Steel Element Clamp
2	DXE-ECL-24SS Stainless Steel Element Clamp
2	1/4" x 2-3/4" long Stainless Steel Hex Head Bolt
2	1/4" x 3" long Stainless Steel Hex Head Bolt
2	1/4" x 3-1/4" long Stainless Steel Hex Head Bolt
2	1/4" x 3-1/2" long Stainless Steel Hex Head Bolt
16	1/4" Stainless Steel Flat Washer
8	1/4" Stainless Steel Nyloc Hex Nut

DXE-8040VA-1 Element Sections



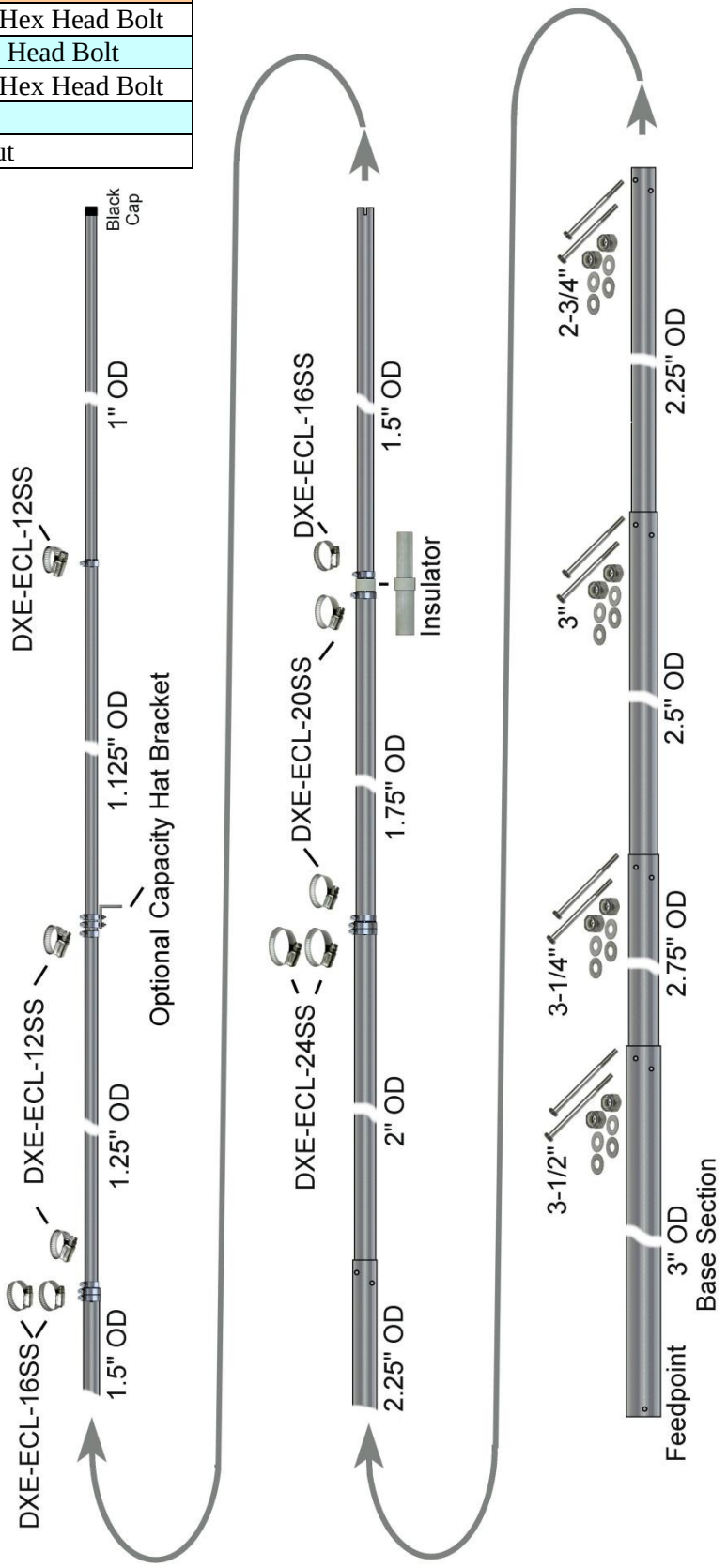
Note: The 3" OD x 72" long, 0.120" wall thickness base antenna section has already been installed on the Pivot Base Assembly.

2. Locate the following hardware:

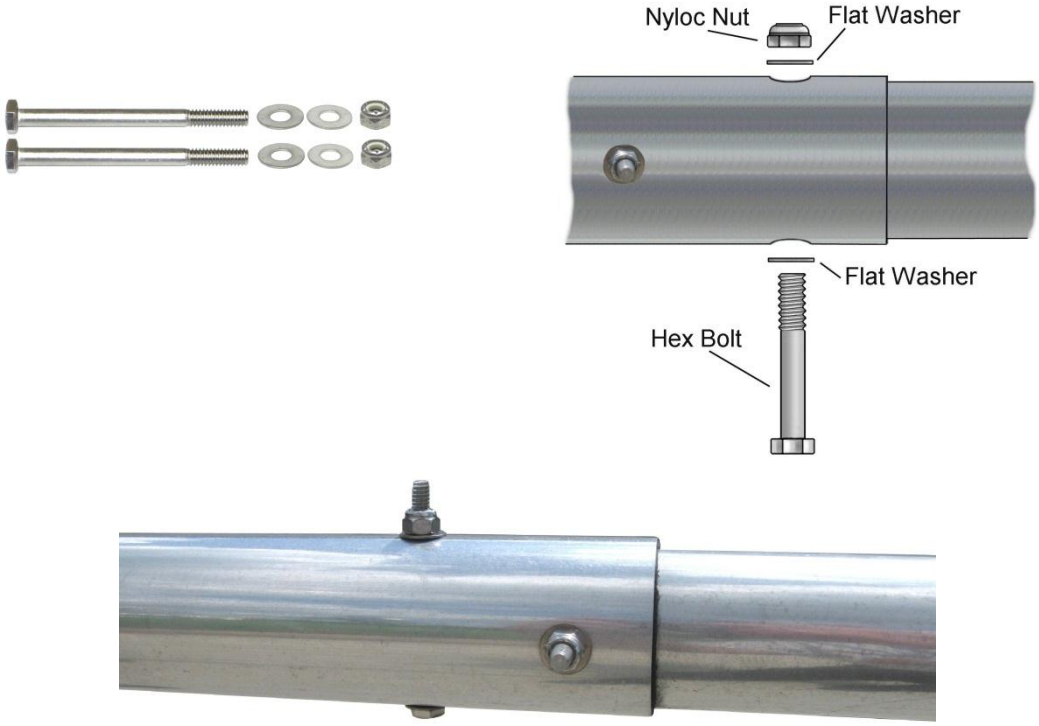
QTY	Description
2	1/4" x 2-3/4" long Stainless Steel Hex Head Bolt
2	1/4" x 3" long Stainless Steel Hex Head Bolt
2	1/4" x 3-1/4" long Stainless Steel Hex Head Bolt
12	1/4" Stainless Steel Flat Washer
6	1/4" Stainless Steel Nyloc Hex Nut

3. The diagram to the right is an overall layout of all the vertical elements with hardware and placement of the optional capacity hat bracket are shown for reference.

   The 3" OD element which is already mounted on the base pivot assembly is shown for reference.



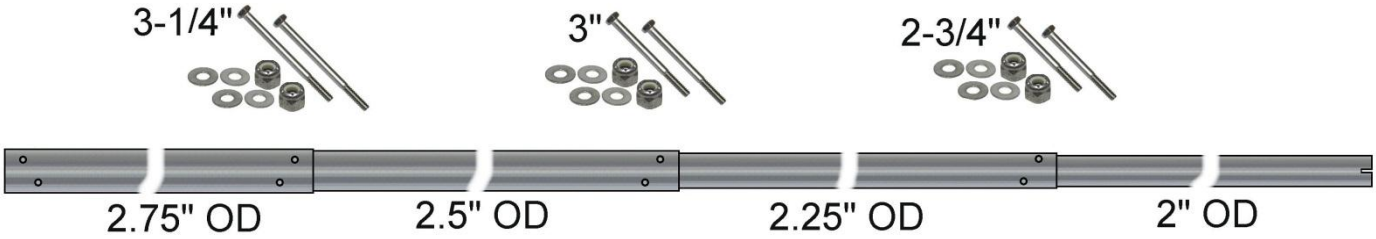
4. Assemble the 2.5" OD element to the 2.75" OD element using the two stainless steel 3-1/4" long 1/4" bolts, four stainless steel flat washers and two 1/4" stainless steel Nyloc nuts as shown below. Make sure you insert the 2.5" OD tube into the correct end of the 2.75" OD section - the holes at each end are drilled differently. When tightening the bolt and Nyloc nut, tighten them enough to hold, but not tight enough to deform the aluminum elements.



The following drilled sections are drilled to match the next size, so make sure you have the correct ends matched up (holes aligned).

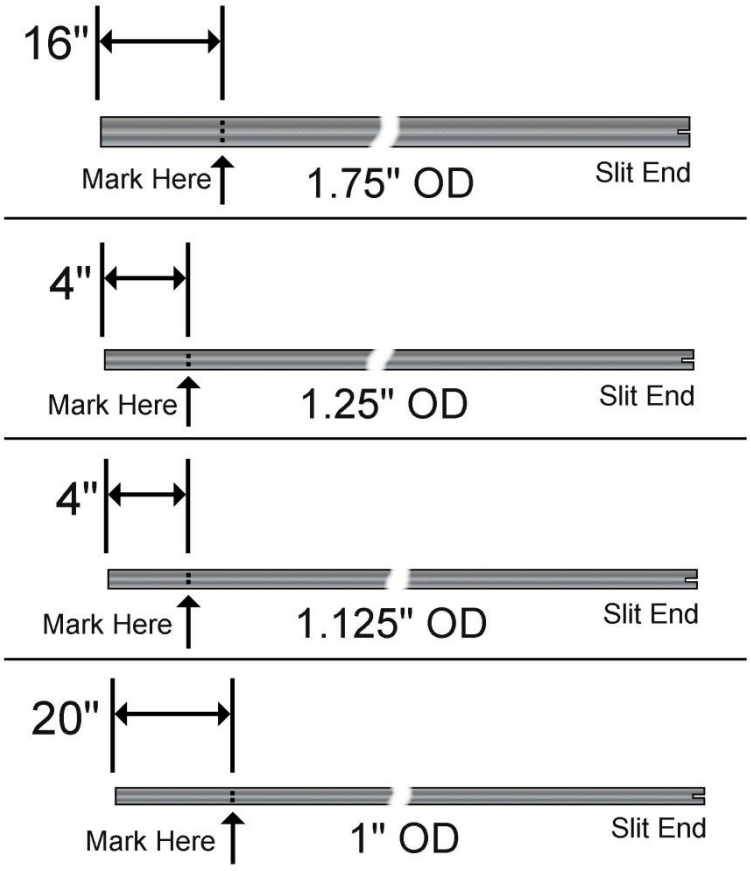
5. Repeat the above step to mate the 2.25" OD element to the 2.5" OD element using the 3" long 1/4" bolts.

6. Repeat the above step to mate the 2" OD element to the 2.25" OD element using the 2-3/4" long 1/4" bolts.



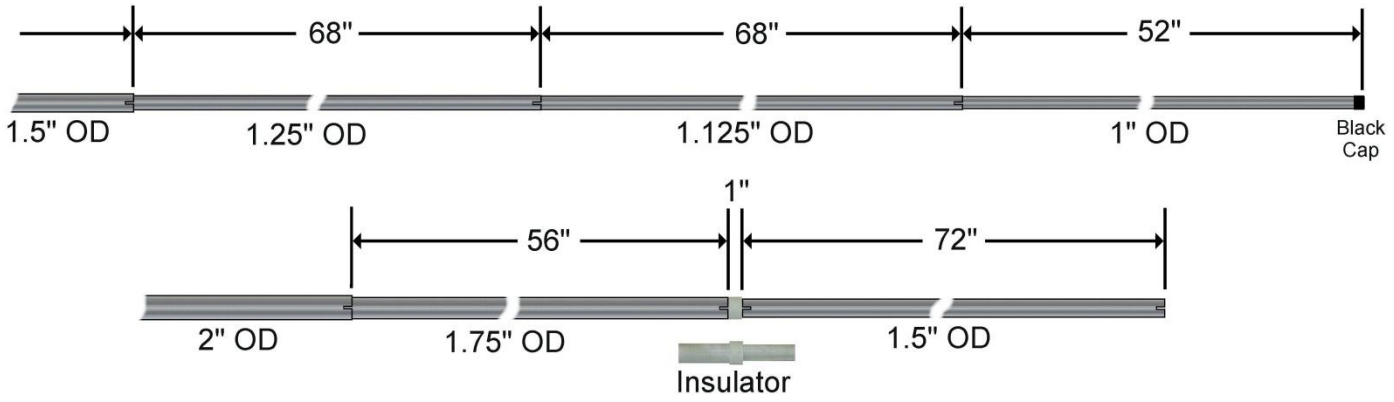
7. Using a tape measure and felt tip pen, four of the 72" long slit tubing elements need to be marked as follows:

The 1.75" OD element is marked 16" from the end without the slit.
The 1.25" OD element is marked 4" from the end without the slit.
The 1.125" OD element is marked 4" from the end without the slit.
The 1" OD element is marked 20" from the end without the slit.

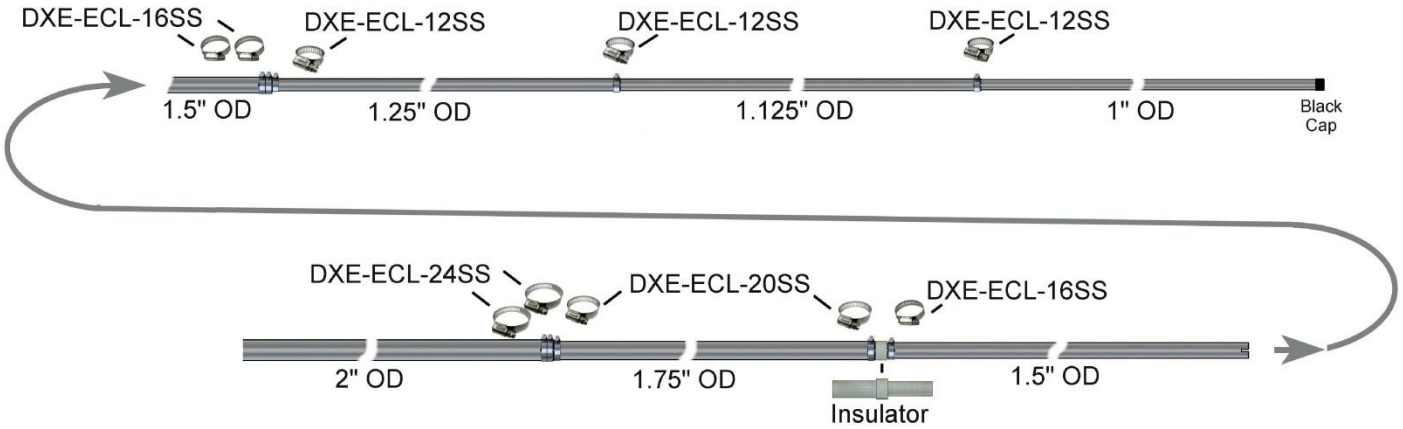


8. Element Clamps are installed approximately 1/4" to 1/2" below the end of the slit tube with the worm tightening drive located between two of the four slits as shown below.

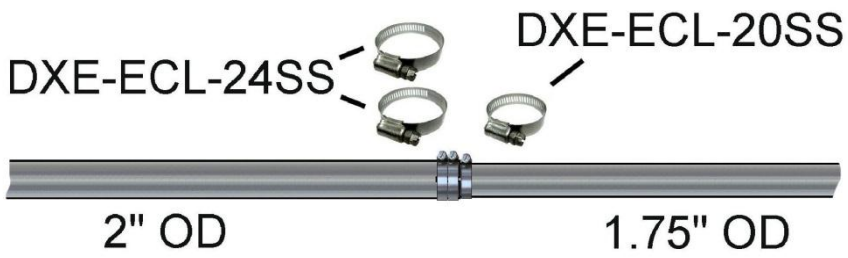
9. The five slit elements are installed using Stainless Steel Element Clamps. The drawing below shows the exposed lengths for reference.



The reference drawing below shows the hardware used for joining the slit elements.

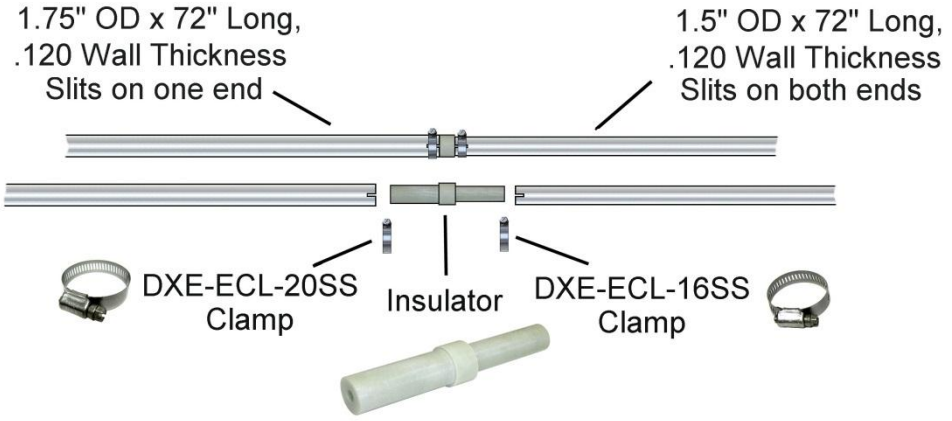


10. Locate two **DXE-ECL-24SS** Stainless Steel Element Clamps, one **DXE-ECL-20SS** Stainless Steel Element Clamp and the 1.75" OD x 72" element that was marked in step 7. Slide the two **DXE-ECL-24SS** element clamps over the 2" OD element. Slide the one **DXE-ECL-20SS** element clamp over the 1.75" OD element. Slide the 1.75" OD element inside the 2" OD element to the mark made at 16". Tighten the two **DXE-ECL-24SS** clamps in place. Do not over-tighten which may cause clamp damage. This tubing joint uses a second clamp to ensure proper element position. Slide the **DXE-ECL-20SS** next to the joint between the 2" OD element and 1.75" OD element. Tighten the clamp in place. This third clamp ensures that the 1.75" section cannot slip further inside the 2" OD section.

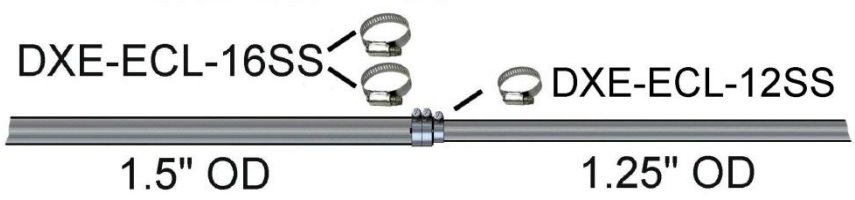


11. Locate the Insulator, one **DXE-ECL-20SS** Stainless Steel Element Clamp, one **DXE-ECL-16SS** Stainless Steel Element Clamp and the 1.5" OD x 72" long element that has slits at both ends.

    Slide the **DXE-ECL-20SS** over the 1.75" OD element. Slide the **DXE-ECL-16SS** over the 1.5" OD element. The larger diameter end of the insulator fits inside the 1.75" OD element. The smaller diameter side fits inside the 1.5" OD element. Position the element clamps over the slits and tighten as shown below.



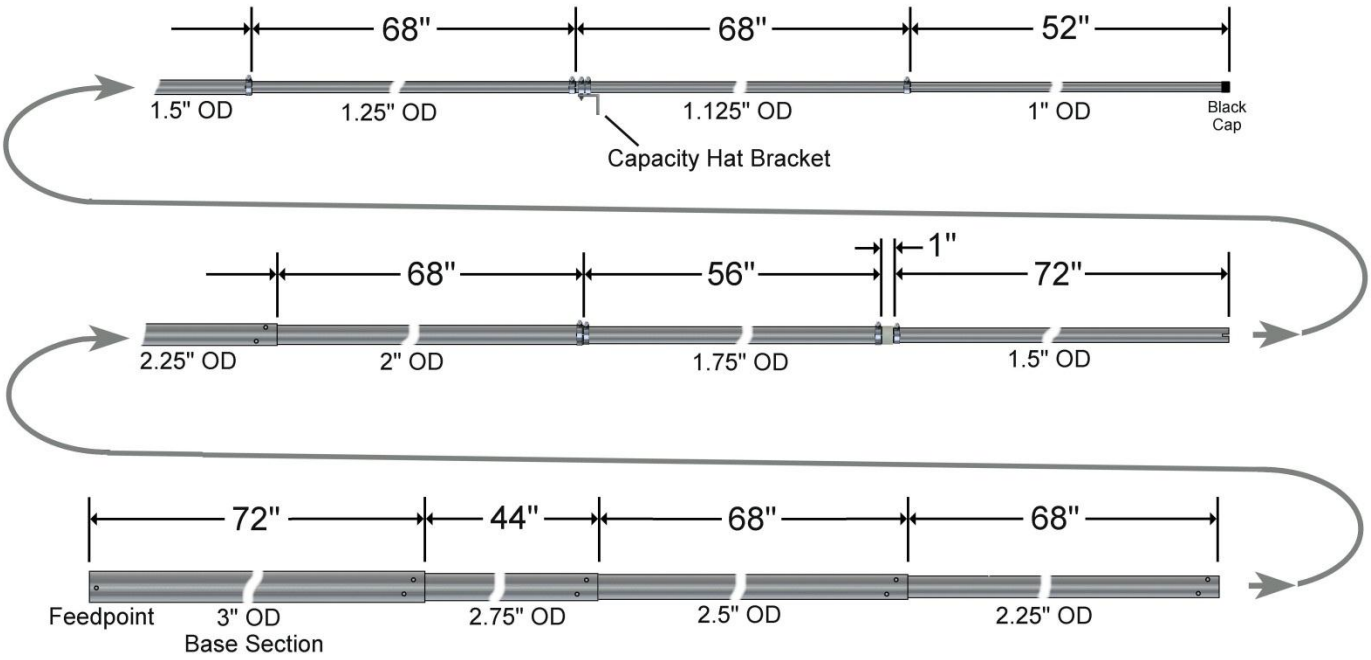
12. Locate two **DXE-ECL-16SS** Stainless Steel Element Clamps, one **DXE-ECL-12SS** Stainless Steel Element Clamp and the 1.25" OD x 72" element that was marked in step 7. Slide the two **DXE-ECL-16SS** element clamps over the 1.5" OD element. Slide the one **DXE-ECL-12SS** element clamp over the 1.25" OD element. Slide the 1.25" OD element inside the 1.5" OD element to the mark made at 4". Tighten the two **DXE-ECL-16SS** clamps in place. Do not over-tighten which may cause clamp damage. This tubing joint uses a second clamp to ensure proper element position. Slide the **DXE-ECL-12SS** next to the joint between the 1.5" OD element and 1.25" OD element. Tighten the clamp in place. This third clamp ensures that the 1.25" section cannot slip further inside the 1.5" OD section.



13. Locate the **DXE-ECL-12SS** Stainless Steel Element Clamp and the 1.125" OD x 72" element that was marked in step 7. Slide the **DXE-ECL-12SS** element clamp over the 1.125" OD element. Slide the 1.125" OD element inside the 1.25" OD element to the mark made at 4". Tighten the **DXE-ECL-12SS** clamp in place.

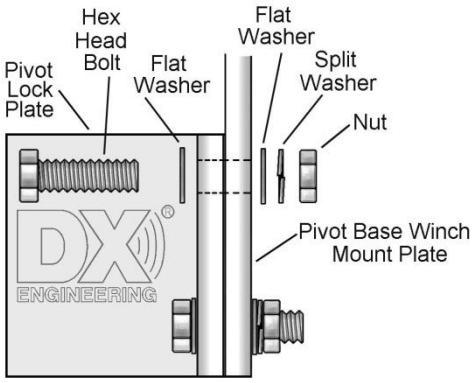
14. Locate the **DXE-ECL-12SS** Stainless Steel Element Clamp, the 1" OD x 72" element that was marked in step 7 and the Black Vinyl Cap. Slide the **DXE-ECL-12SS** element clamp over the 1.125" OD element. Slide the 1" OD element inside the 1.125" OD element to the mark made at 20". Tighten the **DXE-ECL-12SS** clamp in place. Install the black vinyl cap on the top end of the 1" OD element.

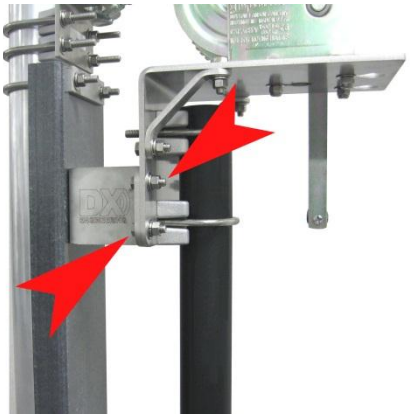
Once mounted to the 3" OD base element section, the overall length prior to final tuning will be 637" or 53 feet, 1 inch.



Mating the Vertical Element to the Pivot Base Assembly

1. To lower the antenna, ensure the winch hook is in the Antenna Hook Mount. Remove the four bolts and hardware that hold the Pivot Lock Plate to the Pivot Base Winch Mount Plate. You can now use the winch to pivot the antenna downward.

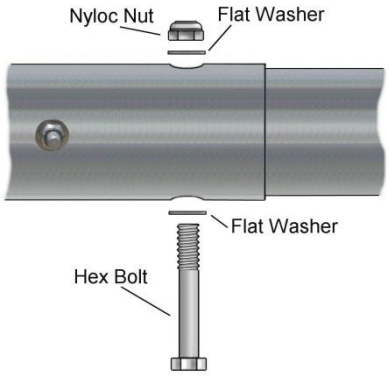




Four Bolts to be removed to allow for pivoting

2. Locate the 3-1/4" long 1/4" bolts, four stainless steel flat washers and two 1/4" stainless steel Nyloc nuts. Align the 3" OD base section element with the assembled vertical elements. Slide the 2.75" element section into the 3" OD base element section aligning the 4 holes.

3. Assemble the 2.75" OD element to the 3" OD element using the two stainless steel 3-1/4" long 1/4" bolts, four stainless steel flat washers and two 1/4" stainless steel Nyloc nuts as shown below. When tightening the bolt and Nyloc nut, tighten them enough to hold, but not tight enough to deform the aluminum elements.



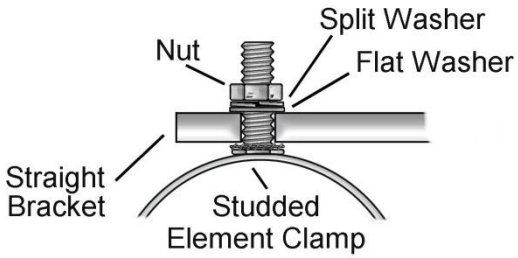
DANGER: When raising or lowering the vertical antenna make sure you have not inadvertently located the antenna underneath power lines.
Residential power lines are often less than 40' high.
Contact With Any Power or Utility Lines Can Be Lethal !

80/40 Trap Assembly and Installation

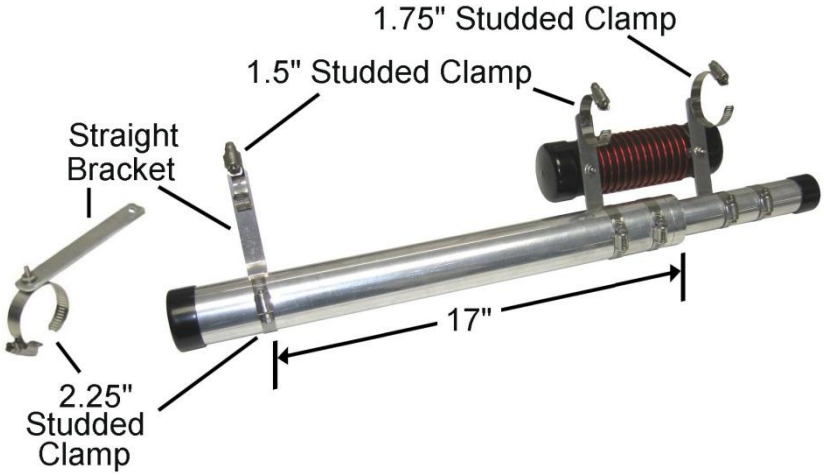
The 80/40 Special 5 kW Trap Assembly is pre-built and tuned to the proper frequency. **Do not alter the telescoping tubing lengths, they are factory set.** The assembly is mounted to the vertical antenna straddling where the insulator was installed. Mounting is accomplished using four studded element clamps and one straight bracket with stainless steel hardware.

80/40 Trap Assembly	
QTY	**Description**
1	Custom Pre-Assembled and Tuned 80/40 Trap Assembly
1	80/40 Antenna Straight Bracket
1	**DXE-ECLS-225** 2.25" Studded Element Clamp
1	**DXE-ECLS-175** 1.75" Studded Element Clamp
2	**DXE-ECLS-150** 1.5" Studded Element Clamp
4	#10-24 Stainless Steel Hex Nuts
4	#10 Stainless Steel Flat Washer
4	#10 Stainless Steel Split Washer
4	#10 Stainless Steel External Tooth Star Washer

1. Install the 2.25" studded clamp on the Antenna Straight Bracket using a #10 stainless steel flat washer, #10 stainless steel split washer, #10 stainless steel external tooth lock washer and a stainless steel 10-24 hex nut as shown.



2. Install the antenna straight bracket with clamp on the trap approximately 17" from the end of the larger tube as shown below. Just snug the element clamp in place. It will be tightened in a later step.

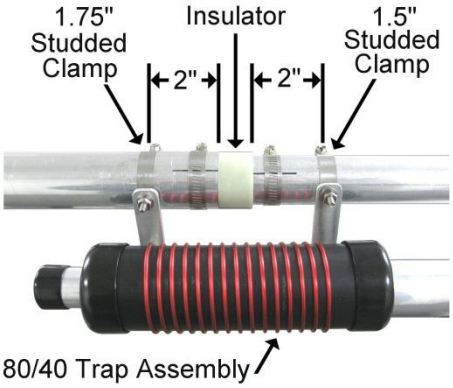


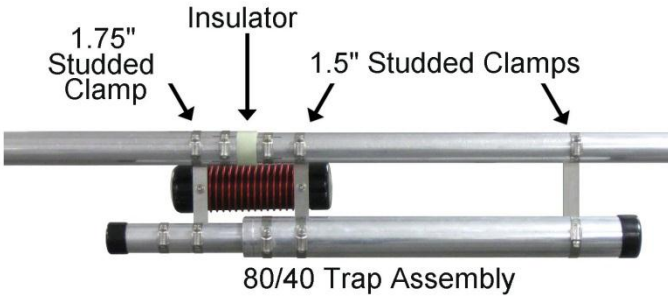
Two views showing the opened studded element clamps and straight bracket installed on the 80/40 trap assembly

3. Using the stainless steel hardware, install one 1.5" studded clamp on the straight bracket as shown above. Install one 1.5" and one 1.75" studded clamp on the trap brackets as shown above. Unscrew (or open) the three element clamps (two 1.5" and one 1.75" clamps) to allow easy installation of the 80/40 trap assembly on the antenna in the next step.

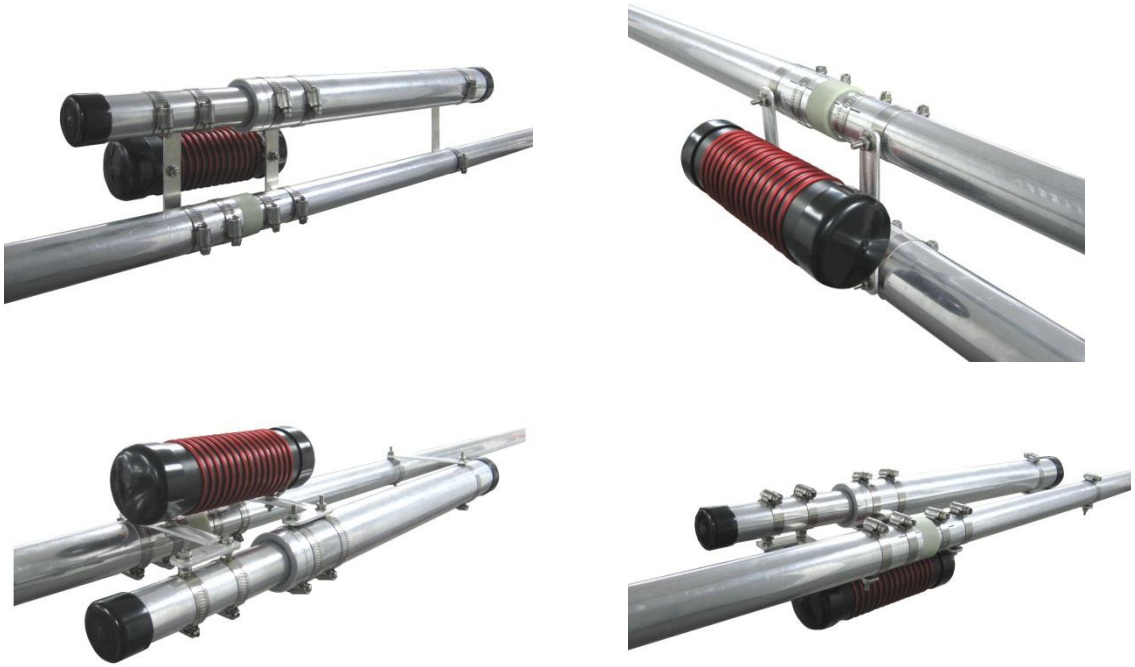
4. Install the 80/40 trap assembly to the vertical antenna by placing the two trap assembly clamps straddling across the insulator and the third clamp further up the antenna element as shown below.

   When installed, the 1.75" clamp is located approximately 2" below the insulator on the antenna and the 1.5" clamp is located approximately 2" above the insulator on the antenna.





5. Once in place and aligned parallel to the antenna elements, tighten all the element clamps securely.



Various views showing the 80/40 trap installed on the antenna

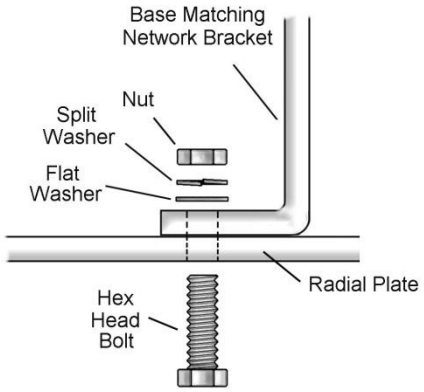
Base Matching Network Assembly and Installation

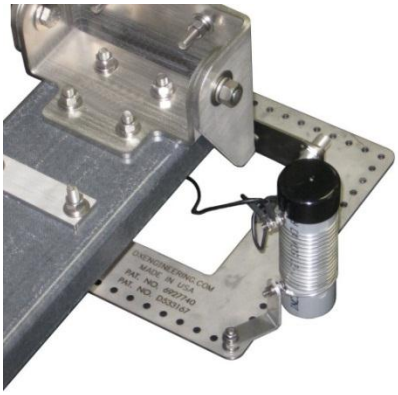
Base Matching Network Assembly	
QTY	**Description**
1	Custom made base loading coil assembly with wire & Coil Tap Clip
1	1/4" Flat Washer
1	1/4" Split Lock Washer
1	1/4-16 Nut

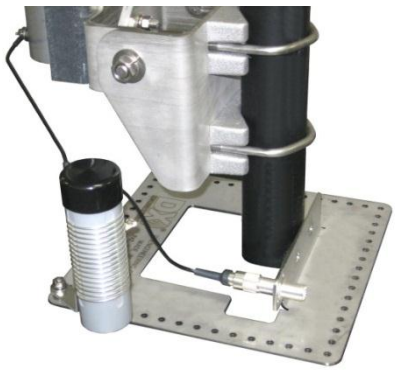
In areas where there is a high atmospheric static condition (areas prone to precipitation or snow static) this antenna (as with all antennas) will build up a static charge. When working on the antenna, especially in the raised position, you may want to ground the antenna to bleed off any static before touching the antenna. (Obviously, you also do not want RF present on the antenna when touching it). The Base Matching Network (described below) will also act as a constant static bleed for your resonant vertical antenna in areas where precipitation static or snow static is present.

1. Use a small Phillips head screwdriver to loosen the tap clip screw and position the tap clip on the 6th or 7th turn on the coil as shown (this will be re-adjusted during tuning). Attach the Base Matching Network Assembly to the optional **DXE-RADP-3** Radial Plate using the 1/4" flat washer, 1/4" split lock washer and 1/4-16 hex nut as shown below. Verify the wires and coax will not be in the way when pivoting the antenna.

2. Install the optional **DXE-363-SST** - Bulkhead Fitting to the radial plate and the Connect the PL-259. The other wire with the ring terminal from the coil is connected to the feedline connection point on the antenna base section.



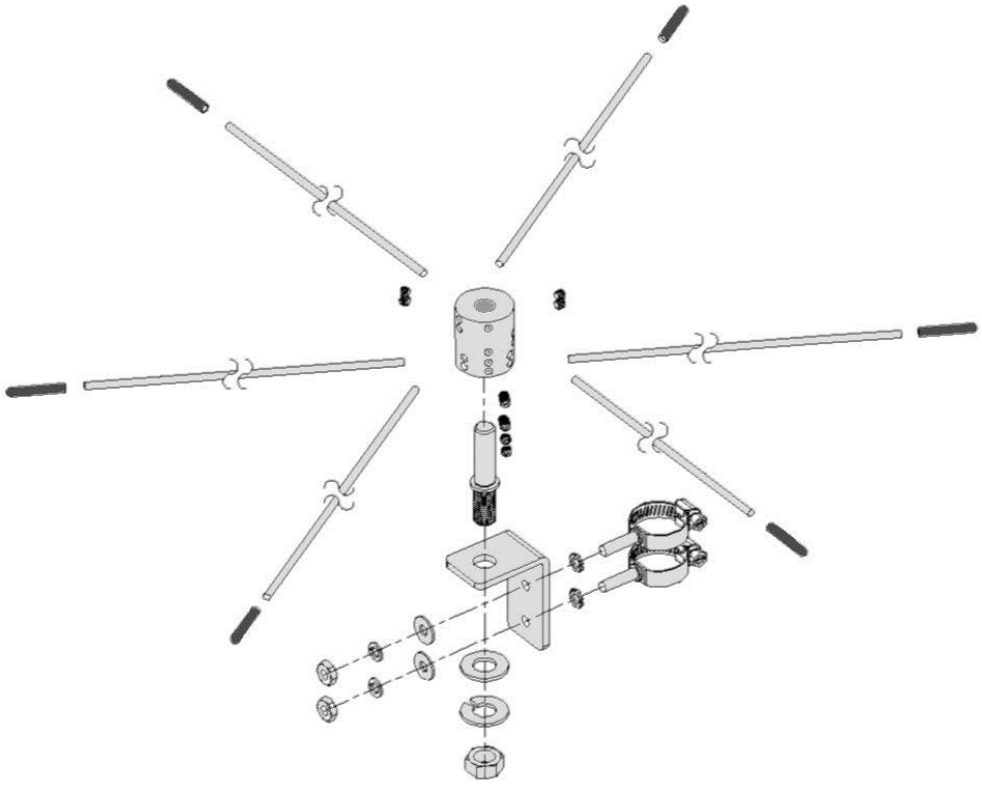




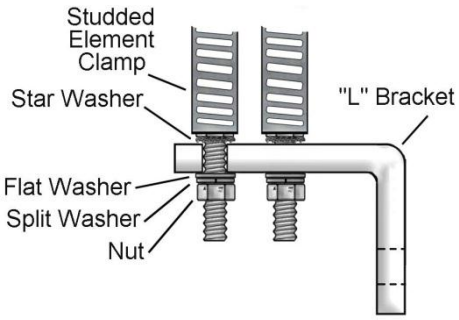
Optional Capacity Hat Assembly and Installation

This patented add-on kit for the **DXE-8040VA-1** high performance DX Engineering THUNDERBOLT® vertical antenna allows the center of resonance to be moved down to the low band edge for dedicated CW operations. If you do not install it, skip this section and proceed to the Tuning section of this manual.

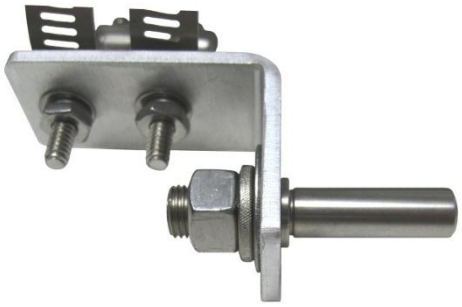
The drawing to the right shows the optional Capacity Hat parts for reference. Also included in this kit is one 5/64" Allen wrench and one spare 1/8" and one spare 1/4" long stainless steel Allen screws.

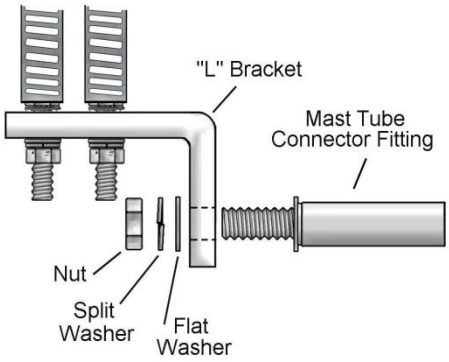


1. Locate the two 1-1/4" studded element clamps, the Top Hat "L" Bracket, two #10 stainless steel star washers, two #10 stainless steel split washers, two #10 stainless steel washers and two #10 stainless steel hex nuts. Assemble the studded element clamps to the "L" bracket as shown below.



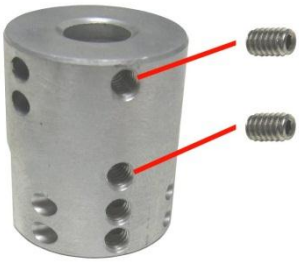
2. Locate the 1/2" Mast Tube Connector Fitting, one 3/" stainless steel flat washer, one 3/8" stainless steel split lock washer, and one 3/8-24 stainless steel hex nut. Assemble the mast tube connector fitting to the "L" bracket as shown below.



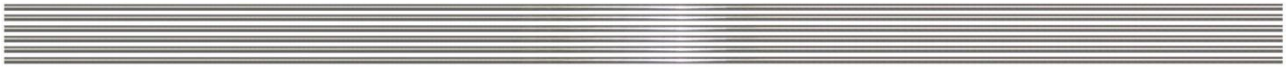


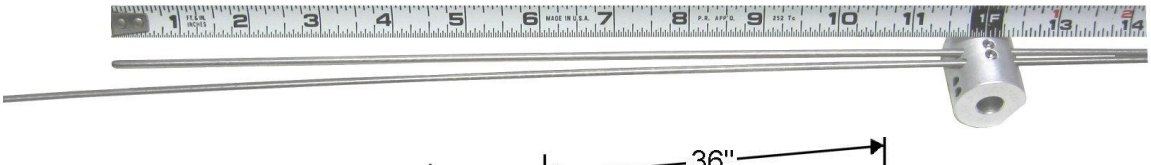
3. Install the "L" bracket to the vertical antenna on the 1.125" OD element, just above the 1.25" OD element as shown below. Tighten the studded element clamps to hold the assembly in place.

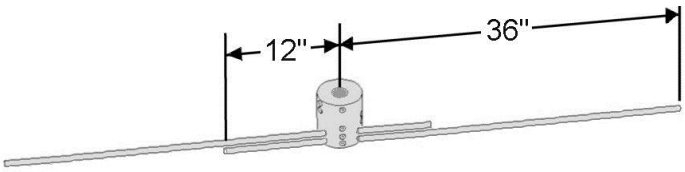
4. Locate the patented Smooth Hub and two #8-32 x 1/4" long Stainless Steel Screw - Cup Point Allen screws. Using the supplied 5/64" Allen Wrench screw the 1/4" long Allen screws in the smooth hub in the two places as shown below. Only put these Allen Screws in half way, they will be tightened in a later step. These are the two Allen Screws that hold the smooth hub to the 1/2" mast tube connector fitting.

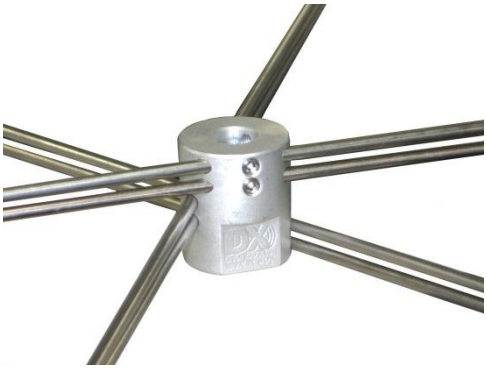


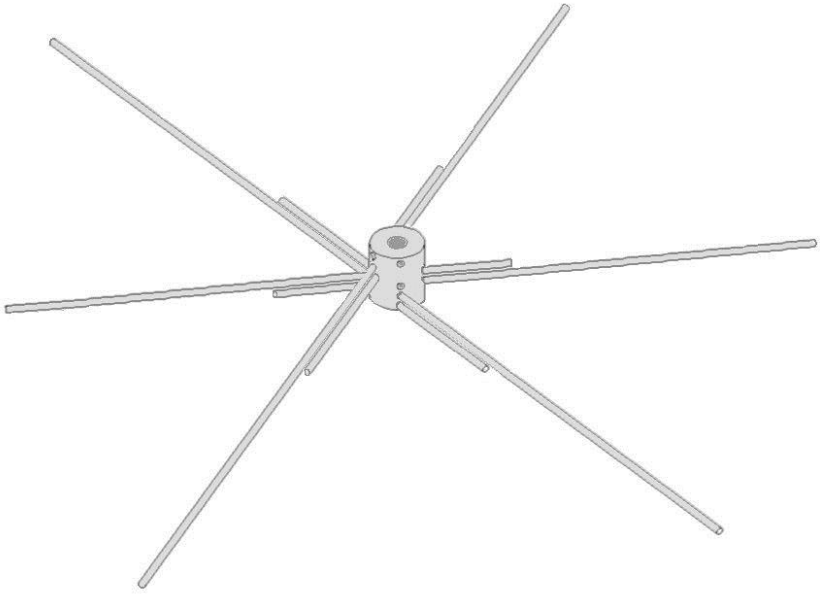
5. Locate the six smaller Allen screws (1/8" long) and install them loosely in the smooth hub as shown below. These are the Allen Screws that will hold the Hot Rodz® in place after you adjust their lengths. Insert the Hot Rodz® in the smooth hub as shown below. Slide them in the smooth hub and adjust their length to be 3 feet. Tighten the appropriate Allen screw to hold them in place. Refer to the pictures below for reference.











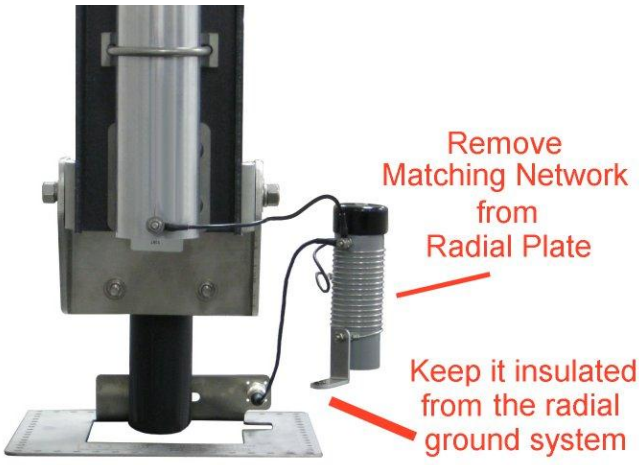
6. Install the Smooth Hub with the Hot Rodz® on the 1/2" Mast Tube Connector Fitting. Rotate the smooth hub to position the Hot Rodz® so they are not touching the vertical antenna element. Lock the smooth hub in place by tightening the two long Allen screws that were installed in Step 4.

7. Locate and install the six plastic end caps on the ends of the Hot Rodz®.

Tuning the Vertical

Tuning the **DXE-8040VA-1** 80/40 Meter Vertical Antenna is straightforward and intuitive. If you use an SWR meter or an analyzer at the base of the antenna you will get the most accurate readings in a timely fashion.

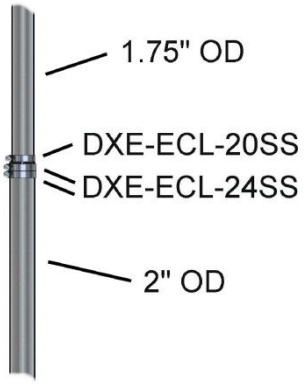
Since the 2:1 SWR bandwidth of the antenna is approximately 400 kHz on 40 meters the adjustment parameters are relatively broad and fine adjustment is not usually necessary. It is best to start the adjustment process without the Matching network connected. See picture on right showing the Matching network removed and insulated from the ground radial system.



As a result, initial 40 meter SWR measurements at the feedpoint of the antenna may indicate slightly elevated minimum SWR. This will be reduced substantially when the Base Matching Network is connected.

Note: During the following adjustments **Do Not Make any Adjustment to the Trap.**

Note: For the purposes of these instructions the term "resonance" or "resonant frequency" is defined as the point of lowest SWR and may be used interchangeably.



To adjust the low SWR point in the 40 meter band, merely adjust the length of the tubing section just below the trap assembly in the normal manner, i.e., making it longer lowers the 40M resonant Frequency and shortening it raises the frequency. The section is made moveable by loosening three element clamps, one on the 1.75" inch tubing section and two on the 2" slit tubing, and then sliding the upper 1.75" section of the antenna either closer to the base of the antenna or farther away depending on whether you want to lower or raise the frequency of resonance. Be sure to tighten the clamps after making an antenna length adjustment.

As assembled per instructions, the minimum SWR point for the 75 meter band should be near 3800 kHz. The length of the topmost tubing section is adjusted to change the 80M resonant frequency as indicated by the point of lowest SWR. Similar to the way in which the 40M adjustments were made, loosen the 1.125" section clamp and lengthen the top 1" section to move the frequency of the minimum 80M SWR lower. Likewise, make the 1" section shorter to make the resonant frequency higher. Be sure to tighten the clamps after making an antenna length adjustment.

Connecting the Base Matching Network will reduce the minimum SWR on 80 and 40 meters. There will be some effect on the frequency of lowest SWR for each of the bands. Compensate for the effect that the network has on the frequency of minimum SWR by making minor readjustments of the physical positions of the antenna element sections as described above.

Reconnect the Matching Network to the Radial Plate. Connect the Tap Clip in the Base Matching Network at the 6th or 7th turn from the top as shown and proceed as follows:

1. Adjust the tap clip by moving the tap clip to a different coil turn on the Base Matching Network Coil for minimum SWR on 80M. Disregard any frequency shift of the points of lowest SWR on this band at this time.

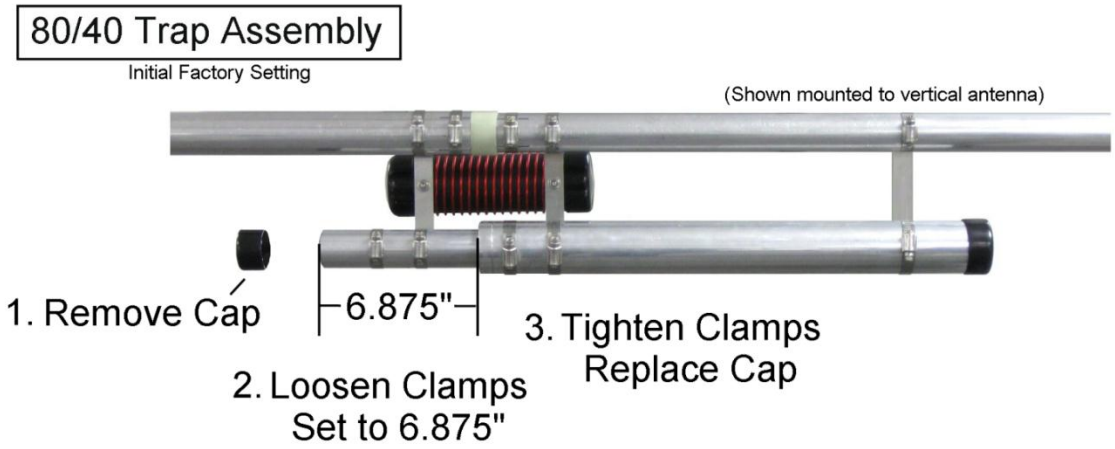
2. Adjust the tap clip by moving the tap clip to a different coil turn on the Base Matching Network Coil for minimum SWR on 40M. Disregard any frequency shift of the points of lowest SWR on this band at this time.

3. Recheck the lowest SWR on the 80M band. If the SWR of the 80M Band is higher move the tap clip on the Base Matching Network Coil to a position that gives the best SWR on each band. Securely tighten the tap clip when done.

Once final tuning is complete and you have verified correct operation on-the-air, the coil tap can be soldered in place to eliminate any future intermittent connection due to environmental corrosion to the coil tap.

Factory Trap Setting

The trap assembly is pre-tuned at the factory using measuring and test equipment. You should not have to adjust the trap. However, if you find that the trap has been moved, maybe when you took it apart to install the antenna at a new location, or you accidently loosened the wrong clamp and the position slipped, you can physically set the trap to 6.875" as shown below. Keep in mind that this is not a firm absolute measurement and further testing and adjustment may be needed to find the ideal length again may be required.



Operation of the DXE-8040VA-1 for CW portion of the 80M band

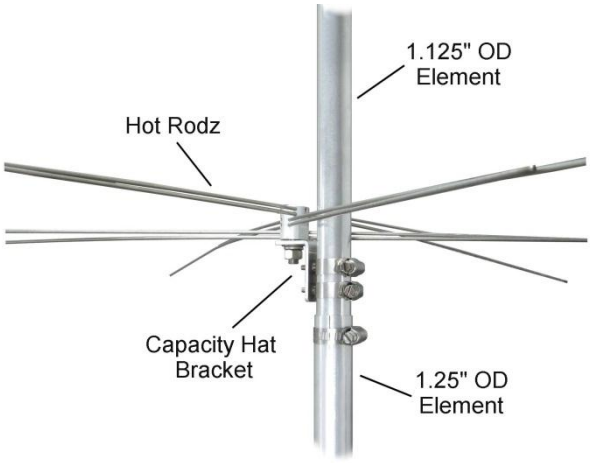
To optimize the **DXE-8040VA-1** for operation near the bottom of the 80M band, add the optional patented capacity Top Hat Kit model **DXE-7580-THK**.

Assemble the Top Hat and install it at the position shown in the diagram below.

Adjust the physical position of the Top Hat on the 1.125" element tube section to achieve resonance on your target frequency.

Sliding the Top Hat higher will shift the point of resonance to a lower frequency.

The position of the Top Hat Kit rods within the hub will also affect tuning. Shortening the rods or removing some of them will shift the resonant frequency higher.



Locking the Pivot Base

To help prevent accidental pivoting, ensure the four pivot locking bolts are in place and properly secured. Additionally, you may replace one of the bolts with a padlock to further prevent tampering or accidental pivoting as shown below.

Ensure all four Pivot Locking Bolts are in place

Padlock used in place of one Pivot Locking Bolt

DXE-8040VA-1 Parts List

Pivot Base Assembly - US Patent No. 8,130,168	
QTY	**Description**
1	Base Side Bottom Hinge
1	Antenna Side Bottom Hinge
2	Bottom Hinge Bushing
1	Heavy Duty Antenna Insulator Channel
2	Saddle Backing Plate 1/4”
1	Antenna Pivot Hook Mount
1	Pivot Base Winch Mount
2	Pivot Base Plate Bracket
1	Pivot Base Lock Plate
2	Backing Plate, Square
2	Saddle Spacer Plate 3/8”
4	3" Stainless U-Bolt
4	3" Cast Saddle Clamp
40	3/8" Flat Washer
32	3/8" Split Lock Washer
32	3/8-16 Nut
8	3/8-16 x 1.25" Long, Hex Head Cap Screw
4	2"-3" Cast V-Saddle
4	2"-3" 3/8"-16 V-Bolt
8	3/8-16 x 1-1/2" Long Stainless Steel Carriage Bolt
2	1/2-13 x 1-1/4" Long Stainless Steel Hex Head Cap Screw
4	1/2" x 1-1/4" Stainless Steel Washer
2	1/2" Stainless Steel Lock Washer
2	1/2-13 Stainless Steel Nut

Optional DXE-VRW-1 Manual Winch Assembly

QTY	Description
1	1500 Pound Exposed Gear Hand Winch with Brake
1	Custom Polyester web strap with Hook, 2" x 15 Ft
1	3/8-16 x 3-1/2" long Grade 8 Hex Head Bolt
4	3/8-16 Stainless Steel Nyloc Nut
3	3/8-16 x 1" long Stainless Steel Hex Bolt
8	3/8-16 Stainless Steel Flat Washer

Feedpoint Hardware

QTY	Description
3	1/4" External Star Washer
1	1/4-20 x 1" long Stainless Steel Hex Head Cap Screw
2	1/4" Stainless Steel Flat Washer
2	1/4" Stainless Steel Nut
1	1/4-16 Nut

Vertical Elements Assembly

QTY	Description
1	3" OD x 72" long, 0.120" wall, 5 drilled holes
1	2.75" OD x 48" long, 0.120" wall, 8 drilled holes
1	2.5" OD x 72" long, 0.120" wall, 8 drilled holes
1	2.25" OD x 72" long, 0.120" wall, 8 drilled holes
1	2" OD x 72" long, 0.120" wall, 4 drilled holes, slits on one end
1	1.75" OD x 72" long, 0.120" wall, slits on one end
1	1.5" OD x 72" long, 0.120" wall, slits on both ends
1	1.25" OD x 72" long, 0.058" wall, slits on one end
1	1.125" OD x 72" long, 0.058" wall, slits on one end
1	1" OD x 72" long, 0.058" wall, slits on one end
1	Black Vinyl Cap for 1" OD Tube
1	80/40 Heavy Duty Insulator, 1.25"/1.5" DIA x 9" long
3	DXE-ECL-12SS Stainless Steel Element Clamp
3	DXE-ECL-16SS Stainless Steel Element Clamp
2	DXE-ECL-20SS Stainless Steel Element Clamp
2	DXE-ECL-24SS Stainless Steel Element Clamp
2	1/4" x 2-3/4" long Stainless Steel Hex Head Bolt
2	1/4" x 3" long Stainless Steel Hex Head Bolt
2	1/4" x 3-1/4" long Stainless Steel Hex Head Bolt
2	1/4" x 3-1/2" long Stainless Steel Hex Head Bolt
16	1/4" Stainless Steel Flat Washer
8	1/4" Stainless Steel Nyloc Hex Nut

80/40 Trap Assembly	
QTY	**Description**
1	Custom Pre-Assembled and Tuned 80/40 Trap Assembly
1	80/40 Antenna Straight Bracket
1	DXE-ECLS-225 2-1/4" Studded Element Clamp
1	DXE-ECLS-175 1-3/4" Studded Element Clamp
2	DXE-ECLS-150 1-1/2" Studded Element Clamp
4	#10-24 Stainless Steel Hex Nuts
4	#10 Stainless Steel Flat Washer
4	#10 Stainless Steel Split Washer
4	#10 Stainless Steel External Tooth Star Washer

Base Matching Network Assembly	
QTY	**Description**
1	Custom made base loading coil assembly with wire & Coil Tap Clip
1	1/4" Flat Washer
1	1/4" Split Lock Washer
1	1/4-16 Nut

Optional DXE-7580-THK Capacity Hat Assembly	
QTY	**Description**
1	Smooth Hub (US Patent No. 7,002,525)
1	0.5" Mast Tube Connector Fitting
7	#8-32 x 1/8" long Stainless Steel Allen Screw - Cup Point
3	#8-32 x 1/4" long Stainless Steel Allen Screw - Flat Point
6	Hot Rodz® - .125" x 48" Stainless Steel
6	Plastic End Cap, 0.110" x 1" long
2	Studded Element Clamp, 1-1/4"
2	#10 Stainless Steel Star Washer
2	#10 Stainless Steel Flat Washer
2	#10 Stainless Steel Split Lock Washer
2	#10-24 Stainless Steel Nut
1	3/8" Stainless Steel Flat Washer
1	3/8" Stainless Steel Split Lock Washer
1	3/8-24 Stainless Steel Hex Nut
1	Top Hat 'L' Bracket
1	5/64" Allen Wrench

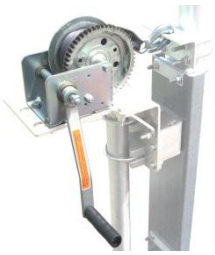
Note: This antenna system is normally shipped in several boxes. The hardware parts maybe in more than one box. The part lists listed above are arranged for ease of assembly.

Additional material required, but not supplied:

1. **Antenna Mounting Pipe** - 2-1/2" Schedule 80 Galvanized steel mounting pipe, (2.895″ OD) x 7 feet long minimum (*see text for more information*)

2. **Concrete** - For mounting pipe installation (*see text for suggestions*)

Suggested Parts Not Included

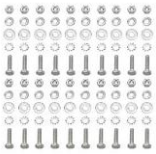


DXE-VRW-1 - Manual Winch Add-on Raising Kit
Manual winch add-on kit for the High Performance DX Engineering vertical antennas **DXE-8040VA-1** and **DXE-7580VA-1**. The tilt fixtures for these antennas are equipped to accept the winch directly. Allows easy raising and lowering of tall antennas - may be easily moved from one antenna to another in multi-antenna arrays.

DXE-7580-THK - patented CW Optimizer Capacity Hat for 75/80 and 80/40 Antennas
This add-on kit for the **DXE-8040VA-1** and **DXE-7580VA-1** high performance DX Engineering THUNDERBOLT® vertical antennas allows the center of resonance to be moved down to the low band edge for dedicated CW ops. Consists of hub and 48" adjustable Hot Rodz®. Easy to add to or remove from upper antenna mast with single bolt after lowering antenna.

DXE-RADP-3 - Radial Plate (patented):
Made from Laser Cut Stainless Steel with 20 Sets of Stainless Steel Radial Attachment Hardware. The DX Engineering Radial Plate is meant for those of you having a vertical antenna and want an easy, neat and effective way to connect those essential radial wires to your antenna system for the highest efficiency and strongest signals.

DXE-SSVC-3P - Stainless Steel V-Clamp for 2 to 3 inch steel pipe
This V-Clamp is made in one size that fits Steel tubing or pipe from 2 to 3" OD as used in antenna construction. The supplied V-bolt is long enough to attach tubing to thick plates and is made with anti-corrosive properties. The special Stainless Steel saddle has serrated teeth will clamp to the pipe securely by biting into the surface. For this reason, it is not recommended for softer aluminum tubing or pipe. U-Bolt thread dimensions: 3/8"-16 x 1.75". V-bolt and saddle made from high-strength 18-8 stainless steel.



DXE-RADP-1HWK - Radial Plate Wire Attachment Hardware Kit
Additional 20 Sets of ALL Stainless Steel Radial Hardware for use with the DX Engineering Stainless Steel Radial Plate.
(20) 1/4" Bolts - (20) 1/4" Nuts - (20) 1/4" Flat Washers
(20) 1/4" Split Washers - (20) 1/4" Star Washers

DXE-363-SST - Bulkhead Fitting, SO-239 Socket, Silver Plating, PTFE Insulation
This hi-quality bulkhead connector uses silver plated outer and inner conductors and a PTFE insulator. The connector has very low loss and high electrical break down. It comes with two nuts to secure the connector to our radial plate or other flat surface. Perfect for use with the DX Engineering Radial Plate, (**DXE-RADP-3**) it ensures the radial ground system, the antenna ground and the feedline shield are common. It can also be used in other coaxial applications where the male ends (PL-259) of 2 coax cables need to be connected, such as when joining two pieces of coax together. Don't forget to waterproof coaxial connections.

- Silver plated, PTFE insulated, Very low loss, High electrical break down
- 2 inches long

Optional Accessory Items

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.

***UMI-81343**	Anti-Seize, 1 oz. Squeeze Tube
***UMI-81464**	Anti-Seize, 8.5 oz. Aerosol Can
***DXE-NSBT8**	Never-Seez®, 8 oz. Brush Top
***DXE-NMBT8**	Never-Seez®, 8 oz. Brush Top, Marine Grade

*** 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-STPL - Radial Wire Anchor Pins, 100/pack - No need to bury your radials!
DX Engineering Radial Wire Anchor Pins are perfect for fastening radials below the grass line to eliminate the risk of damaging your radials during lawn maintenance.

- 100 count - 6" Pins
- 11-Gauge

DXE-STPL-100P	Radial Wire Anchor Pins, 100/pack
DXE-STPL-300P	Radial Wire Anchor Pins, 300/pack

DXE-STPL-100BD - Radial Wire Staple, Biodegradable, 3", 100 pack
DX Engineering DXE-STPL-100BD is a 100-pack of 3" **biodegradable** anchors that are produced from recycled PLA (Polylactide Resin). Depending on the weather conditions, they will degrade in about a year. They are easily installed and will hold radial wires in place until lawn roots overtake them - and then disappear. Ecologically friendly!

DXE-RADW - 500K or 1000K Radial Wire Kits and Components

To achieve optimal performance with a ground-mounted vertical, install as many radials as possible. These bulk radial wire kits use insulated wire that is UV resistant, hard to see and lays down easily, unlike the wire that is commonly available at the big box stores. It will last much longer in contact with soil than bare wire.

The DXE-RADW- 500K or 1000K kit provide everything you will need to build the perfect radial system!

- 500/1000 ft. spool of 14 AWG, stranded copper wire with vinyl insulation
- 20/40 lugs
- 100/200 radial wire anchor pins - eliminating the need to bury your radials!
- Build up to 20/40 radials, 25 feet long

DXE-RADW-500K	Bulk Radial Wire Kit, 500 ft. Spool of Wire, 20 Lugs, 100 Staples
DXE-RADW-1000K	Bulk Radial Wire Kit, 1000 ft. Spool of Wire, 40 Lugs, 200 Staples

DXE-RADW-500KBD or 1000KBD - Bulk Radial Wire Kits and Components

To achieve optimal performance with a ground-mounted vertical, install as many radials as possible. These bulk radial wire kit use insulated wire that is UV resistant, hard to see and lays down easily, unlike the wire that is commonly available at the big box stores. It will last much longer in contact with soil than bare wire. The biodegradable anchors allow easy installation of radial wires, and will degrade and disappear in a year or so when they are no longer needed. The DXE-RADW-500 or 1000KBD kits provide everything you will need to build the perfect radial system!

- 500/1000 ft. spool of 14 AWG, stranded copper wire with vinyl insulation
- 20/40 lugs
- 100/200 biodegradable radial wire anchor pins- Eliminating the need to bury your radials!
- Build up to 20/40 radials, 25 feet long

DXE-RADW-500KBD	Bulk Radial Wire Kit, 500 ft. Spool of Wire, 20 Lugs, 100 Biodegradable Staples
DXE-RADW-1000KBD	Bulk Radial Wire Kit, 1000 ft. Spool of Wire, 40 Lugs, 200 Biodegradable Staples

DXE-225RT-20 - Ring terminal 16-14 Wire Gauge, 1/4" hole/20 Pack

\his is a set of 20 ring terminals for AWG #14 to #16 wire with a clearance hole for a 1/4" bolt. These are the same crimp terminals supplied with the DXE Radial Wire Kits for #14 Radial and Antenna Wire.

DXE-RADW-20RT/-32RT/-65RT Pre-Assembled, Radial Wire, with 1/4" ring Terminals, 20 Pack

The DXE-RADW Radial Wire Kits include the highest quality 14 gauge stranded copper wire with a relaxed black PVC insulation for easy installation of your radial system. They allow fast and easy installation of your radial ground system, and permit you to mix and match different length to fit the available space. The stranded wire and relaxed insulation mean that the wire will lay flat as you place it on the ground - easy to install! The twenty pre-cut radial wires include 1/4" ring terminals professionally crimped on one end for quick and easy attachment to the radial plate. These Radial Wire Kits are designed for users of vertical antenna systems which have the need for a high quality radial system for optimum antenna performance. The 1/4" ring terminals are machine crimped for maximum grip. Soldering is not required for strength, but is recommended if installed in corrosive environments such as salt spray.

- Packed 20 Radial Wires per package
- 14 gage, stranded copper wire
- Black relaxed PVC insulation
- 1/4" Ring Terminal professionally crimped on each Radial Wire
- 3 lengths to choose from: 20 Ft (-20RT), 32 Ft (-32RT), 65 Ft (-65RT)

DXE-RADW-20RT	Package of 20 each 20 Ft Radials with 1/4" Ring Terminals
DXE-RADW-32RT	Package of 20 each 32 Ft Radials with 1/4" Ring Terminals
DXE-RADW-65RT	Package of 20 each 65 Ft Radials with 1/4" Ring Terminals

SUM-900031 - Automatic Wire Stripper/Crimper/Cutter, 24-10 Ga.

Our wire stripper uses a spring-loaded design to make quick work of wires ranging from 24 to 10 gauge. Just insert the wire, squeeze the handle, and listen for the click. That's the sound of another perfect wire stripping job performed in about 2 seconds - a fraction of the time it takes your pocket knife to do the same job. An adjustable wire length guide helps you make uniform strips, and a built-in wire cutter and crimper helps you complete your wiring job.

- Spring-loaded design
- Strips wires ranging from 24 to 10 gauge
- built-in wire cutter and crimper

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.

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.

Specifications subject to change without notice.

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