Ice Loading Support Kit

for the

DXE-80VA-3 or DXE-60VA-1P
Vertical Antenna with Top Hat

DXE-80VA-2AK

DXE-80VA-2AK-INS Revision 2a

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P.O. Box 1491 ∙ Akron, OH 44309-1491
Phone: (800) 777-0703 ∙ Tech Support and International: (330) 572-3200
Fax: (330) 572-3279 ∙ E-mail: DXEngineering@DXEngineering.com
Introduction

The **DXE-80VA-2AK Ice Kit** is recommended for geographical areas prone to freezing rain and ice conditions. It will provide additional mechanical support for the capacity top hat of the **DXE-80VA-3** or **DXE-60VA-1P** Vertical Antennas with the capacity top hat installed, while lowering the antenna’s resonant frequency by only 20 kHz. The antenna can be easily adjusted at ground level to re-resonate it at your desired frequency. This kit is also suggested for additional support of the capacity top hat in high wind areas.

The ice kit is comprised of a DX Engineering Multi Purpose Hub, Dacron/Polyester antenna rope, a 30 inch section of 1-3/8” 6063 aluminum tubing and associated hardware for complete installation on an existing **DXE-80VA-3** or **DXE-60VA-1P** antenna with top hat. It provides guy rope support for the six top hat tubing sections. The additional weight loading of ice, along with the summation of wind force vectors, is then transferred downward through the main antenna tubing.

Included Materials

The kit contains the following components:

- One DX Engineering Multi-Purpose Hub
- One 1-3/8” OD x 30 inch long type 6063 aluminum tubing
- Six High Strength UV Protected Thermoplastic Attachment Links
- Six Cushioned “P” Clamps
- One **SYN-DBR-94-100** 3/32” Dacron/Polyester Rope (100 ft.)
- Stainless Steel attachment hardware

Tools Required

- Two 7/16 inch wrenches, (one of them should be open-end)
- 1/2 inch and 7/16 inch socket and drive
- 7/64 inch Allen wrench
- 5/16 inch nut driver for the element clamps
- Pliers
- Tape measure (inches)
- Felt-tip marker.

It is advisable to use a 3 foot roof antenna tripod (as shown in **Figure 1**) to hold the top hat assembly for installation of the **DXE-80VA-2AK Ice Kit**. The 12 foot diameter top hat can be unwieldy at best if constructed on the floor or ground. If you use a tripod, temporarily remove the topmost section of 1-1/2” tubing from the antenna, and insert it into the tripod clamps - lightly tightening them.
Preparing the DXE-80VA-3 or DXE-60VA-1P for the Ice Kit Add-on

You are about to upgrade your **DXE-80VA-3** or **DXE-60VA-1P** (with optional capacity top hat) THUNDERBOLT™ vertical antenna. At this time, it is a good idea to review your existing installation and upgrade any items which may have deteriorated with time. In addition to checking obvious hardware items, you should inspect the grounding and guying systems.

It is absolutely necessary to provide adequate guying for the upgraded antenna. The addition of the Ice Kit will also increase the wind loading, so your guy lines and anchors should be inspected and replaced – or reinstalled – as necessary. Anti-Seize or Never-Seez should be used on all stainless steel hardware to avoid galling, or seizing.

**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.

**Assembly of Hub and Guy Rope Links**

Locate the DX Engineering Multi Purpose Hub and Ice Kit Hardware bag containing the 1/4”-20 Stainless Steel bolts, nuts and flat washer. Using a 1/4”-20 bolt, two flat washers and a 1/4”-20 hex nut, assemble the hardware to one of the thermoplastic rope links as shown in **Figure 2**. Assemble the remaining five sets of hardware and links in the same manner.

**Figure 2**
Referring to **Figure 3**, take one of the link assemblies and insert the end of the bolt through a hole on the outside of the hub. As it comes through the hole, place a 1/4” square nut in the slot and thread the bolt assembly into the square nut until the threads begin to show inside. Repeat this procedure until all six links are loosely assembled to the hub.

**Figure 3**

### Assembly of Hub to Support Tubing

At this time, locate the 30 inch piece of 1-3/8” OD tubing supplied with the Ice Kit. Measure and mark the tubing 4 inches from one end and 2 inches from the other end using a felt tip marker. Place the hub and link assembly over the tubing and fasten it to the end marked at 2 inches. This will leave approximately 1-1/2 inches of tubing exposed as shown in **Figure 4**. Tighten the bolts evenly, keeping the tubing centered until they are snug. Tighten them snugly taking care not to crush the aluminum tubing. Tighten the hex nuts against the hub with a 7/16” end wrench. This will “jam” the bolt and keep it from loosening. The thermoplastic rope links should move freely on each bolt.

**Figure 4**

Place the black vinyl cap on the top of the center tubing. You may require a liquid soap lubricant to help since it will be very tight. This completes assembly of the hub and rope links.

### Removal of Existing Top Hat

In order to install the Ice Kit to the top hat of your DXE-80VA-3 or DXE-60VA-1P Vertical Antenna, you must remove the top hat. Carefully lower the antenna so the vertical tubing stack rests on a step ladder or other support which will keep it at least 6 feet off the ground. Loosen the clamp which secures the top hat and 8 inch section of 1-3/8” OD tubing to the vertical tubing stack.

The addition of the DXE-80VA-2AK Ice Kit should be done on a flat surface or using a roof antenna tripod (as used for FM or TV antenna mounting) as a temporary fixture. We found the tripod to be the most convenient. The top hat and Ice Kit assembly will be 12 feet in diameter, so you must have a clear area in which to work.

If you use a tripod to support the top hat, you should also remove the top 6 foot section of 1-1/2 inch OD tubing, place it in the tripod and lightly tighten it into place as shown in **Figure 5**.
Remove the existing top hat and short tube section and take it to the area where you have prepared the tripod and 1-1/2 inch OD tubing section. Place it on top as it was installed on the antenna. Do not use a clamp to secure it.

Loosen the “jam” nuts on the three hub screws and then loosen completely - but do not remove - the hex socket screws with a 7/64” hex wrench. At the same time, lift out the short piece of 1-3/8” OD tubing and slide the top hat down over the 1-1/2 inch tubing a few inches and secure it by finger-tightening the cap screws. The short tubing may be discarded. Insert the long end of the 30 inch tubing with the hub and rope links down into the tripod tubing. It should slide smoothly - do not force it. It will be pulled back up to the 4-inch mark you made earlier during final assembly.

**Installation of Clamps to Top Hat Tubing**

Measure and mark each of the six top hat tubing sections at a point 24 inches in from the far ends. This will result in a support point 4 feet out from the center hub.

Locate the six cushioned “P” clamps and the #10-24 hardware. Fasten a clamp to each of the top hat tubing sections at the 24 inch mark you made, assembling the hardware by passing the screw through both holes in the clamp, then adding an aluminum spacer, a flat washer, a lock washer and nut as shown in Figure 6. A pair of pliers will be necessary to help compress the clamp around the tubing while attaching the hardware. Before final tightening, use the pliers to bend the clamps as shown in Figure 7 to allow space to pass the guy rope around the aluminum spacer. Finally, orient the clamp with the ends up and the bolt and spacer horizontal and parallel to the ground.
At this point, we are ready to begin final assembly of the Top Hat and Ice Kit assembly. You will probably need another person to help with this step. You will also need to use a clamp to secure the tubing sections.

Raise the Guy Hub Tube up to the 4-inch mark you made earlier. While someone holds the tube, raise the Top Hat back up onto the Guy Hub tube and secure the two pieces of tubing with the clamp. Make sure at least 4 inches of tubing overlaps.

Loosely tighten the cap screws of the Top Hat hub, securing the top hat hub to the Guy Hub tube just above the junction where you clamped the two tubing sections. At this point you should align the guy rope links so that they swivel in the same direction as a top hat tube by rotating the top hat. Each link should line up with a top hat tube so the rope will be pulling in the direction the link can swivel. When properly aligned, tighten the hex cap screws securely into the tubing and then tighten the “jam” nuts against the hub.

**Fastening the Top Hat Guy Ropes**

A 100 foot roll of 3/16” Dacron/Polyester has been furnished from which to cut the guy ropes. Each of the 6 ropes will be less than 10 feet long when final adjustments have been made, so you should cut 6 ten foot lengths for the following steps. This rope is very strong and rugged, but requires a special knot to stay securely fastened.

The guy ropes should be fastened using a non-slip knot such as shown below.

![Figure 9 – A typical non-slip knot for synthetic rope, before tightening.](image)

Secure one end of each rope section to each of the cushioned “P” clamps assemblies as shown in Figure 9. Make sure the knot is pulled very tight, since this end will not be loosened again for adjustment.

Pass the other end of each rope through the end of the link which lines up with that particular tubing section. The rope should be routed first into the side of the link that has a groove for it, which will minimize strain on the joint. Use the non-slip knot and tie loosely until final adjustments are made.
The ropes should be tightened equally so that all top hat tubes are horizontal and parallel to the ground. At that point, you may securely tighten all knots. Excess rope should be cut off, leaving only an inch or two. A wrap of TRM-06133 Vinyl tape will help secure the rope ends from loosening.

This completes assembly of the Top Hat and Ice Kit.

**Final Assembly and Raising the Antenna**

The Top Hat and Ice Kit assembly may be removed from the tripod and moved to the location of the antenna for final assembly. Replace the 6 foot section of 1-1/2 inch OD which was used with the tripod, so the antenna is at its full 43 foot length with the top end resting at least 6 feet above the ground.

Replace the top hat - with its Ice Kit - and securely clamp the tubing sections.

It is strongly recommended that you have help when you raise this antenna. The tilt-base certainly makes it easier however, this antenna is 43 feet long and can be challenging to put up the first time or with gusty winds. If you have properly laid out your guy system in advance, they 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 guy ropes are in the clear before you begin. It maybe helpful to tape over the clamps on the third and fourth sections to keep the ropes from getting hung on them as you raise the antenna. Starting from the top of the antenna, walk it up slowly using an overhead hand-over-hand motion, maintaining a slow and steady pace. It is recommended to have someone pulling on the guy ropes for additional help in raising the antenna. A push-up pole constructed of an 8 or ten foot two-by-four with small boards nailed to each side of one end in the form of a fork may be used to push up the antenna during the first stages of raising it.

The antenna mounting channel must be kept in alignment with the tilt-base plate to prevent binding until it is positioned in the tilt-base. Once the antenna is vertical, 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.

**Tuning the Antenna**

Since the addition of the DXE-80VA-2AK Ice Kit will lower the resonant frequency by only 20 kHz, tuning is probably unnecessary. However, at this time it is advisable to check the antenna and make whatever adjustments you feel may be appropriate. Refer to the DXE-80VA-3 or DXE-60-VA-1P (as applicable) instruction manual for instructions.
Optional Items

DXE-GUY1000-KIT - Guying Kit for DX Engineering Vertical Antennas

This kit is intended for taller, multi-point guyed antennas and masts. Some vertical manufacturers indicate their antennas do not need guying. During times of high winds or ice loading however, some of these verticals may sustain damage or fail altogether. A four-point guying scheme provides the best mechanical advantage to prevent wind stress, regardless of direction. The guying is intended for stability, and should never be depended on for primary support. The kits can also be used for ground mounted verticals exceeding 30 feet high with four point guying at two or three levels on the vertical radiator. The guying kits are ideal for fixed or portable installations. Included in this kit is:

- (4) Heavy Duty DXE-EA15 15 in x 3 in. screw-in earth anchors with eyelets
- (1) 1000 ft Roll of UV resistant, 3/32 Double-Braided Dacron Polyester Rope(part number SYN-DBR-94-1000)

TRM-06133 - Scotch Super 33+ Vinyl Electrical Tape

Scotch® Super 33+ is highly conformable and super stretchy in all weather applications. This tape provides flexibility and easy handling for all around performance. It combines PVC backing with excellent electrical insulating properties to provide primary electrical insulation for splices up to 600V and protective jacketing.

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

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 website: www.DXEngineering.com for the latest revision manual.

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 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.

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