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COMMUNICATIONS

www.dxpander.net
sales@dxpander.net

DXP-406 Field
DXP-406 Standard





DXPANDER
COMMUNICATIONS

Cobweb Antenna

6, 10, 12, 15, 17, 20,
30 & 40m band

Assembly and Operation Manual

Thank You for Choosing the DXP-406 Cobweb Antenna Series!

Dear Customer,

Thank you for choosing the DXP-406 Cobweb Antenna Series and for placing your trust in my work.

Amateur radio is much more than a hobby. It is a passion that connects people, brings communities together, and opens up a world of communication and discovery. As an amateur radio operator myself, I am truly pleased to share this passion with you and hope that your new antenna will bring you many years of enjoyable and rewarding operating experiences.

The DXP-406 was designed with versatility, performance, and reliability in mind, allowing you to explore multiple HF bands and make contacts around the world. Whether you are using this antenna in a new setup or adding it to an established station, I hope it will meet your expectations and enhance your enjoyment of amateur radio.

This manual has been carefully prepared to guide you through the assembly, installation, and operation of your antenna. Please take a few moments to read the instructions carefully before beginning installation to ensure safe and proper operation.

If you have any questions, need assistance, or would like to share your DXP-406 experience, I would be delighted to hear from you. Your feedback is always welcomed and it helps me to improve my products.

Thank you once again for choosing the DXP-406 Cobweb Antenna. I wish you many successful contacts, excellent DX, and countless memorable moments in the air.

73´s, Erwin, W4HUB & PY2QI
www.dxpander.net

ATTENTION
- Do not handle or install this antenna near power lines
- Always use protective equipment for installation
- Do not touch the antenna when the radio is transmiting
- Wear gloves to handle fiber tubes, since small particles can cause skin irritation

TOOLS & ACCESSORIES REQUIRED (not supplied)
- Small pliers
- Allen Wrenches
- Silicone sealant to protect the coaxial connector
- 50 Ohm coaxial cable
- Mast, tripod, mounting hardware

IMPORTANT NOTES

Effect of rain: When a Cobweb antenna becomes wet, its resonant frequency shifts downward. This occurs because the presence of water increases the antenna's effective capacitance. We observed an average frequency shift of approximately: 40 kHz on the 20, 30, and 40-meter bands, 100 kHz on the 17-meter band, 130 kHz on the 10, 12, and 15-meter bands and 200 kHz on the 6-meter band. These values are based on our prototype and may vary depending on the amount of rain, antenna height, construction, and other installation conditions.

SWR: Excellent SWR performance can be achieved on all bands, with an SWR as low as 1.2:1 at the exact resonant frequency. Cobweb antennas have a relatively narrow bandwidth. Therefore, an antenna tuner may be required to maintain good performance when operating up to 100 kHz away from the resonant frequency.

Flexibility and Portability: The DXP series was designed with flexibility and portability in mind. You can use the antenna for Field Day, POTA, IOTA, or even in your own backyard. The wire elements for each band can be easily removed and stored, as can the fiberglass tubes. This allows you to keep only the central assembly mounted, making the antenna compact and easy to transport. For portable operations, you can choose which bands you want to operate and install only the specific bands that meet your needs. For example, you can configure the antenna for only the 10, 15, and 20-meter bands, or set it up as a single-band antenna for 40 meters.This **modular design** allows you to adapt the antenna to different operating conditions and transportation requirements without sacrificing its versatility.

Field-Tested Performance: The first QSO using the prototype of this antenna was made in August 2026. Since then, the antenna has been actively tested on the air, with 156 contacts made with stations in more than 30 countries as of the date of this edition.These contacts provide real-world operating experience and demonstrate the antenna’s performance under actual conditions.You can view the complete W4HUB logbook on QRZ.com by scanning the QR code.

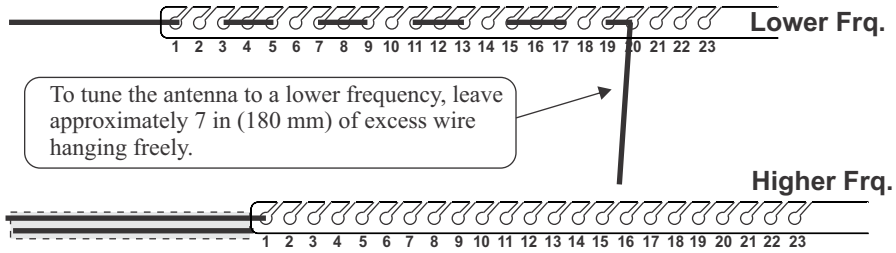
BAND-BY-BAND ADJUSTMENTS

Note: Drawings are not to scale. Wire dimensions are approximate

40m band

The 40-meter band covers 7,000 to 7,300 kHz. Below are the tuning adjustments e achieved with our prototype.

Excess wire after the first hole: Approx. 14.5" (370mm)



SPECIFICATIONS

Cobweb antennas works by folding multiple half-wave dipole wires into compact square shapes mounted on an X-shaped frame, allowing it to radiate horizontally across multiple amateur radio bands using a single feedline. This compact, multiband design offers a practical solution for amateur radio operators seeking efficient HF communication without the space requirements of larger antenna systems.

This antenna produces a pure horizontally polarized signal with a confined electric field. This results in reduced coupling to nearby conductors, so that losses and interference problems are reduced.

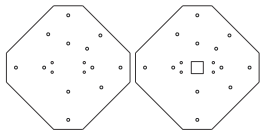
DX Performance: Cobweb antennas are well suited for DX communication due to their horizontal polarization, low-angle radiation at suitable installation heights, and broad coverage without requiring a rotator.

DXP-406 Field and DXP-406 Standard features and Specifications:

- Constructed from UV-resistant materials, including fiberglass, acrylic, stainless steel and tinned copper wire with silicone insulation.
- Frequency Bands: 6, 10, 12, 15, 17, 20, 30, and 40 meters.
- **DXP-406 Field** (Portable Operation) **with quick release clamps**: Designed for easy assembly and disassembly, making it ideal for portable operations.
- **DXP-406 Standard** (Permanent Installation) **with bolts** Designed for permanent installation on a mast.
- Omni-directional (Do not need a rotator).
- Works from 10' (3m) above ground.
- Minimum EMC issues.
- Low SWR bandwidth: Approximately 50 kHz around the center frequency.
- 50 Ohm feed (coaxial cable not supplied).
- 300 Watt maximum power.
- Fully Modular Design: The DXP-406 Field can be assembled with only the bands you wish to operate. For example, if you want to operate from 6 to 20 meters, you can install only the elements for those bands, keeping the remaining elements stored away and using only the fiberglass support structure required for the selected bands.
- Footprint: 296 inches or 7.5m (overall span).
- Durable Construction: Built with a robust design and high-quality materials for excellent strength and durability.
- Color-Coded connectors: Each band element is connected to the distribution box using connectors. Each band features a different connector color for easy identification, simplifying assembly and preventing connection errors.
- Our prototype has been installed outdoors for several months, exposed to direct sunlight, rain, storms, and winds of up to 25 mph (40 km/h).
- Extensively Field-Tested: The prototype was rigorously tested across all bands, with hundreds of QSOs made with stations throughout the United States and in many countries around the world.
- **MADE IN USA**

IDENTIFICATION OF PARTS

Note: Drawings are not to scale



2 × Acrylic Plates (Antenna Center Support)

Field version (with clamps)



4× Center Arm Tubes – 1¼" (32mm) with quick release clamps



4× 1" Tubes (25.4 mm) with quick release clamps

4× 3/4" Tubes (19 mm)



4× 1/2" Tubes (12.7 mm)



1x 1¼" (32mm) distribution box arm with quick release clamp

Standard version (with bolt holes)



4× Center Arm Tubes – 1¼" (32mm) with bolt holes



4× 1" Tubes (25.4 mm) with bolt holes

4× 3/4" Tubes (19 mm) with bolt hole

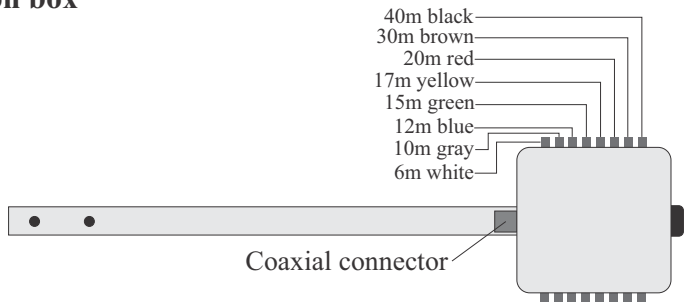


4× 1/2" Tubes (12.7 mm)



1x 1¼" (32mm) distribution box arm
with bolt hole

Distribution box



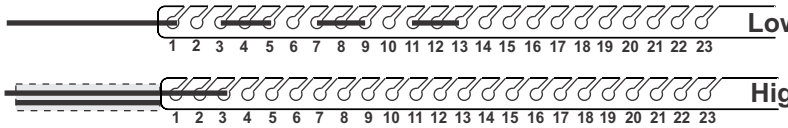
BAND-BY-BAND ADJUSTMENTS

Note: Drawings are not to scale. Wire dimensions are approximate

15m band

The 15-meter band covers 21000 to 21450 kHz. Select the segment of your interest

Excess wire after the first hole: Approx. 8.0" (205mm)



17m band

The 17-meter band is also quite narrow, covering 18068 to 18168 MHz. We tuned this band to 18120 MHz.

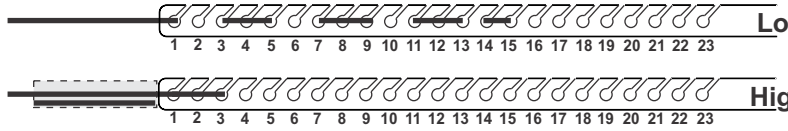
Excess wire after the first hole: Approx. 7.7" (195mm)



20m band

The 20-meter band covers 14.000 to 14.350 MHz. Select the segment of greatest interest for tuning.

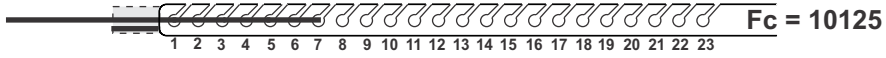
Excess wire after the first hole: Approx. 9.8" (250mm)



30m band

The 30-meter band is only 50 kHz wide, covering 10100 to 10150 MHz. In our prototype, we were able to tune it precisely to the center of the band at 10125 MHz using the dimension shown below.

Excess wire after the first hole: Approx. 5.0" (130mm)



BAND-BY-BAND ADJUSTMENTS

Note: Drawings are not to scale. Wire dimensions are approximate

6m band

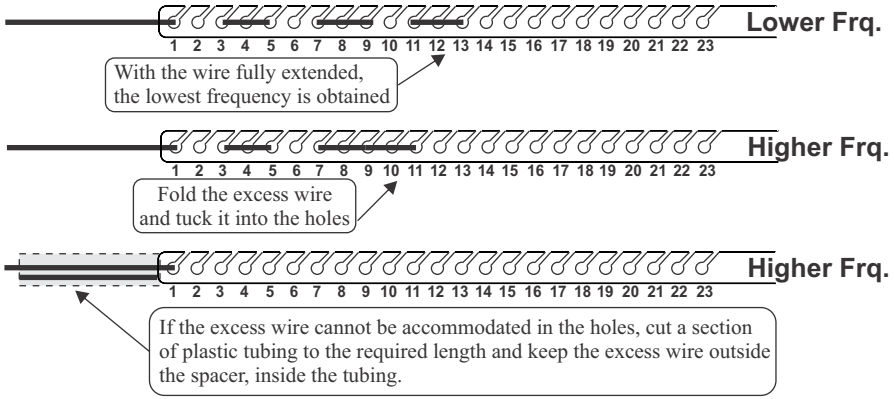
For the 6 m band (50–54 MHZ), even a fraction of an inch (or a few millimeters) can have a significant effect on the resonant frequency. You can fold back the ends of the wires or even cut off the excess. However, do this carefully to avoid having the antenna resonate above 54 MHz.The best approach is to first check the resonant frequency using an antenna analyzer. You will probably get a reading well below 50 MHz. Fold back a small portion of both wire ends and secure them with tape. Measure again and check the frequency. Repeat this process until you reach the desired frequency within the 6 m band.

10m band

The 10 m band extends from 28000 to 29700kHz. Determine which portion of the band you intend to use. Start by measuring the current resonant frequency with the wires left hanging loose. You will probably find a frequency below 28000kHz, indicating that the antenna needs to be shortened to raise the resonant frequency.Use the following illustration as a reference for making the adjustment.

“Sew” the wire as shown in the illustration. Keep both sides symmetrical.

Excess wire after the first hole: Approx. 5.9" (150mm)

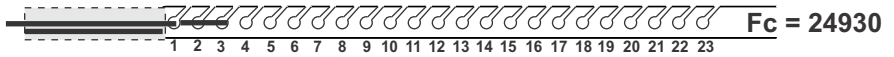


With a lot of patience, make adjustments until you reach preferred center frequency.

12m band

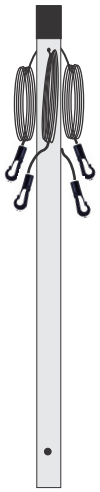
The 12-meter band is very narrow, covering 24890 to 24990 kHz. The illustration below shows the point at which we achieved an adjustment to 24930 kHz.

Excess wire after the first hole: Approx. 6.9" (175mm)

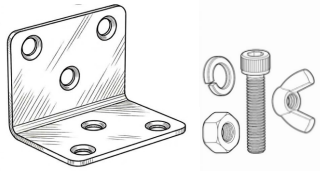


IDENTIFICATION OF PARTS

Note: Drawings are not to scale

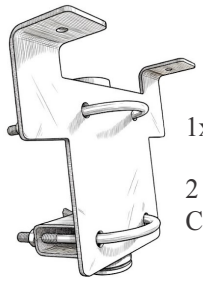


1" (25.4mm) Central Support Mast with guy ropes and hooks (Square Tube)



- 2x Stainless Steel Corner Bracket
- 1x M4 x 35mm bolt (larger one)
- 4x M4 x 16mm bolt
- 5x M4 lock washer
- 4x M4 Hex nut
- 1x M4Wing nut

Mounting bracket kit

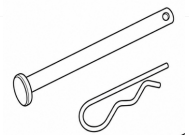


1x Steel Plate

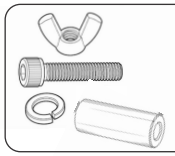
2 U-Bolt Clamps

7x Acrylic Band Spacers





4x M6 x 55mm Clevis Pin with R Shaped spring cotter



- 8x M6 x 65mm bolt
- 8x M6 lock washer
- 2x M6 Hex nut
- 6x M6 Wing nut
- 2x M6 x 1-1/4" spacer

These parts are for the standard version only



9x M5 x 40mm bolt
9x M5 lock washer
9x M5 Wing nut

Antenna Wire kits

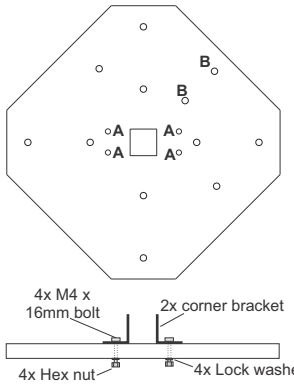


2x 40 m Band Antenna Wire (Black)
2x 30 m Band Antenna Wire (Brown)
2x 20m Band Antenna Wire (Red)
2x 17m Band Antenna Wire (Yellow)
2x 15m Band Antenna Wire (Green)
2x 12m Band Antenna Wire (Blue)
2x 10m Band Antenna Wire (Gray)
2x 6m Band Antenna Wire (White)

40 in (1.0m) of heat-shrink tubing for the antenna ends, to be cut as required.

ASSEMBLY

Note: Drawings are not to scale





1 - Take the acrylic plate with the square hole in the center and install two corner brackets at points A

2 - Note that the vertical wall of the bracket should face inward, aligned with the central square hole

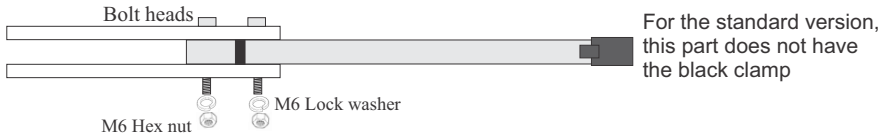
3 - Install four M4 × 16 mm bolts (the shorter ones), four lock washers, and four nuts. Tighten firmly.

4 - Insert one M6 × 65 mm bolt into each hole marked 'B' on the same plate

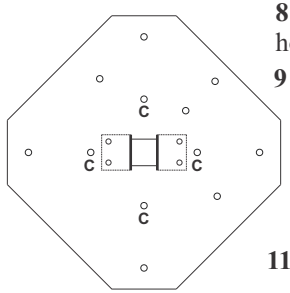
5 - Insert the distribution box arm tube and pass the two bolts through it

6 - Install the other acrylic plate, making sure the holes are properly aligned

7 - Install one M6 lock washer and one M6 hex nut on each bolt. Do not fully tighten at this point



Two central tubes have nylon clips. These two tubes must be installed immediately next to the center tube, with the clips facing upward.

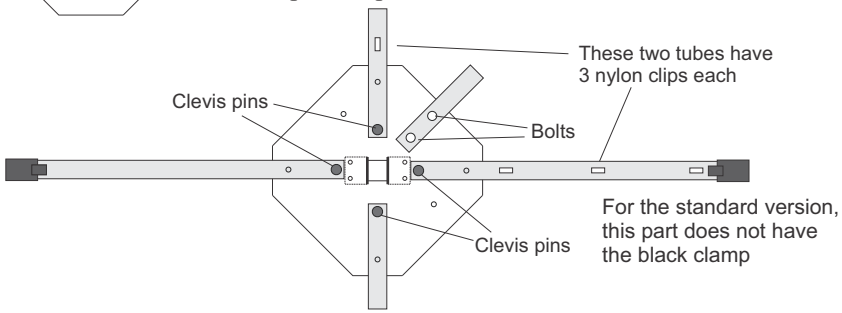


8 - Position the other plate (without the hole) so that the holes align with those on the plate with the brackets

9 - Take the four smaller 1-1/4" tubes (Center Arm Tubes)

10 - Position one of the tubes between the two plates and insert a clevis pin at Point C, passing it through the first plate, the tube, and the other plate. The head of the clevis pin should be on the plate with the square hole. Install the cotter on the underside.

11 - Repeat Step 10 for the other three Center Arm Tubes



BAND-BY-BAND ADJUSTMENTS

Note: Drawings are not to scale. Wire dimensions are approximate

Adjusting your Cobweb Antenna DXP-406 Cobweb Antenna is a process that requires patience and time to achieve the best performance.

The prototype was tested at only 6 ft (1.8 m) above the ground, and even at this low height, its performance was very good on the higher bands (6 to 20 meters). When we raised the antenna to 10 ft (3.0 m), we made many QSOs on the 30 m and 40 m bands as well.

One of the main characteristics of Cobweb-type antennas is their low receive noise, which can provide a significant advantage, especially in noisy environments.

For adjustment, place the antenna 5 to 6 ft (1.5 to 1.8 m) above the ground. Note that the resonant frequency tends to increase by approximately 30 to 50 kHz as the antenna is raised. Therefore, you may want to tune the antenna to a slightly lower frequency before raising it to its final operating height.Connect a 50-ohm coaxial cable to the antenna and use an antenna analyzer to achieve the best performance. Use silicone sealant to protect the coaxial connector

Since this antenna has an approximate bandwidth of 100 kHz, select your preferred portion of the band and adjust the antenna for the lowest SWR within that range. Even so, you can use your radio's automatic antenna tuner to achieve a wider usable bandwidth.The suggested measurements below were obtained from our prototype and are provided only as a reference to help you begin the adjustment process. **We cannot guarantee that the measurements on your antenna will be exactly the same.**

To adjust your new antenna, remember this basic rule: to lower the resonant frequency, increase the length. To raise the frequency, decrease the length.

Use an antenna analyzer to check the resonant frequency of each band. At this point, with the ends of the elements hanging down, the resonant frequency should be below or close to the lower edge of each band.

BAND	Lower F limit	Upper F limit
6m	50.000 MHz	54.000 MHz
10m	28.000 MHz	29.700 MHz
12m	24.890 MHz	24.990 MHz
15m	21.000 MHz	21.450 MHz
17m	18.068 MHz	18.168 MHz
20m	14.000 MHz	14.350 MHz
30m	10.100 MHz	10.150 MHz
40m	7.000 MHz	7.300 MHz

INSTALLATION OF BAND WIRES

Note: Drawings are not to scale

5 - 12m (BLUE) – Take the wires with the blue connectors. Connect one to each blue connector on both sides of the distribution box. Route each side through the second clips on the 1" (25.4mm) tubes, as shown in the illustration.

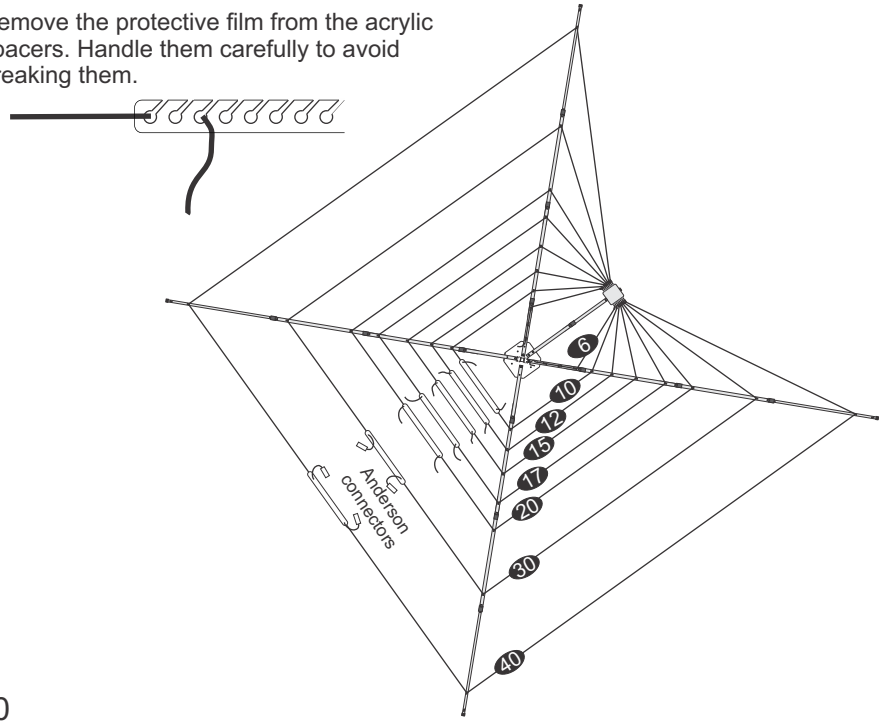
6 - Repeat this procedure for the remaining bands, routing each wire through its corresponding nylon clip:

- **15 m**: Green
- **17 m**: Yellow
- **20 m**: Red
- **30 m**: Brown
- **40 m**: Black

7 - Install a band spacer on each band from 10 to 40 meters, as shown below.

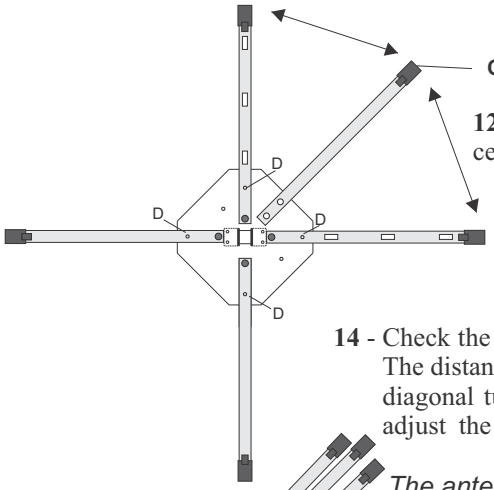
8 - Route the wire for each band through the first hole of the corresponding band spacer. Pull each side so that the antenna is properly tensioned and the excess wire is the same length on both sides. Then insert the wire through the third hole, as shown in the illustration, and leave the ends loose for now. Note that the 30 m and 40 m wires have an Anderson connector at their ends.

Remove the protective film from the acrylic spacers. Handle them carefully to avoid breaking them.



ASSEMBLY

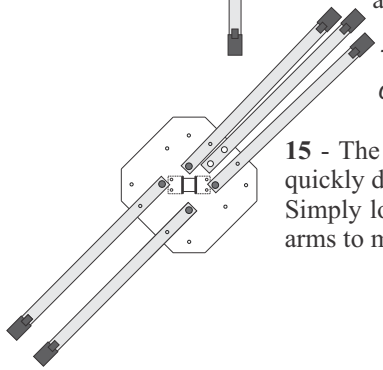
Note: Drawings are not to scale



12 - Tighten the two bolts securing the central tube firmly

13 - Install one M6 × 65 mm bolt at each Point D, using one lock washer and one wing nut. Tighten securely.

14 - Check the dimensions indicated by the arrows. The distance between the central tube and each diagonal tube must be the same. If necessary, adjust the position and tighten the wing nut



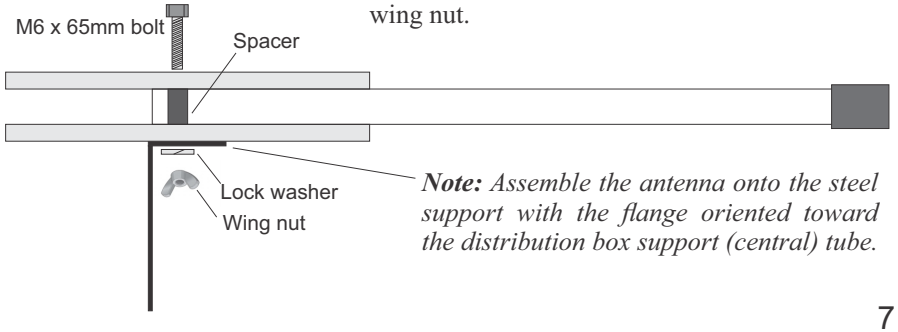
The antenna can remain in this configuration to facilitate transportation

15 - The four wing nuts are designed to allow you to quickly disassemble the antenna for portable operation. Simply loosen the four wing nuts and fold the antenna arms to make transportation easier



16 -Assemble the antenna support using the two U-bolts and the steel plate so that the complete assembly can be secured to a mast with a diameter of 1-1/4 to 2-1/4 in (32 to 57 mm)

17 - Secure the L-shaped steel plate to the acrylic assembly using the two remaining holes. Place one 1-1/4 in (32 mm) spacer in each hole. Insert an M6 × 65 mm bolt through each spacer and secure from underneath with a lock washer and wing nut.



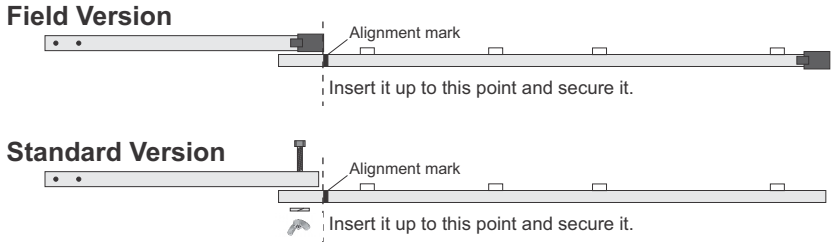
Note: *Assemble the antenna onto the steel support with the flange oriented toward the distribution box support (central) tube.*

ASSEMBLY

Note: Drawings are not to scale

18 - Mount the antenna on a support at least 5 ft (1.5 m) above the ground to facilitate the assembly of the tubes and the installation of the wires for each band.

19 - If you have the Field version, simply insert each tube, from the largest to the smallest, into the clamps and secure them. If you have the Standard version, insert one tube into another until the holes are aligned. Insert an M5 × 40 mm bolt and secure it with a lock washer and wing nut. For both versions, insert each tube up to the marked position, as shown in the illustration.Keep the nylon clips facing upward.

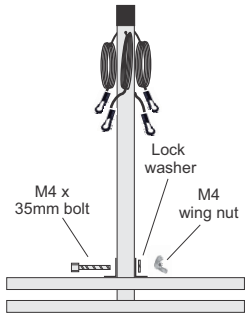


20 - The smallest 1/2 in (12.7 mm) tube does not have a clamp or fastening screw. Simply insert it into the preceding tube. The stainless-steel D-ring, where the guy ropes will be attached, acts as the stop.

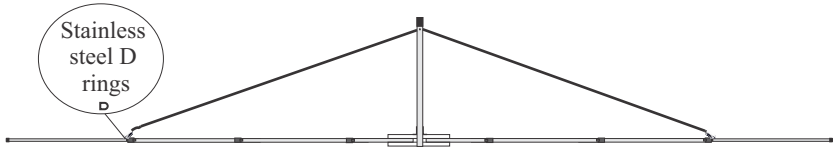
21 - Now use the same procedure to install the band distribution box tube.

22 - Insert the support mast through the square hole until it contacts the bottom plate.

23 - Secure the mast with the M4 × 35 mm bolt (the longer one), a lock washer, and a wing nut.



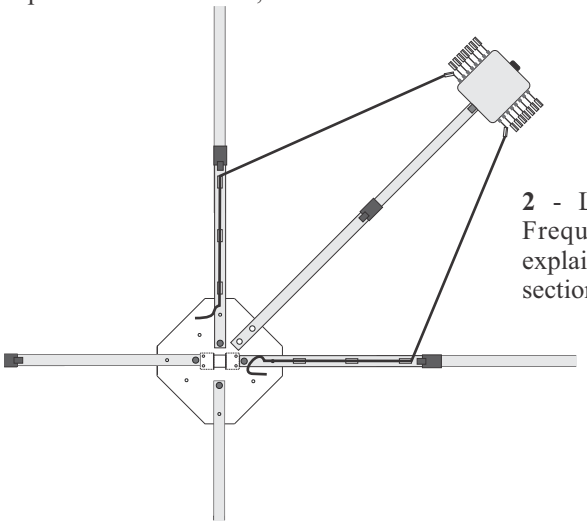
24 - Connect the hooks on the support mast guy ropes to each of the D-rings attached to the four smallest tubes. The ropes should be pulled tight and under sufficient tension to keep the entire assembly stable and level.



INSTALLATION OF BAND WIRES

Note: Drawings are not to scale

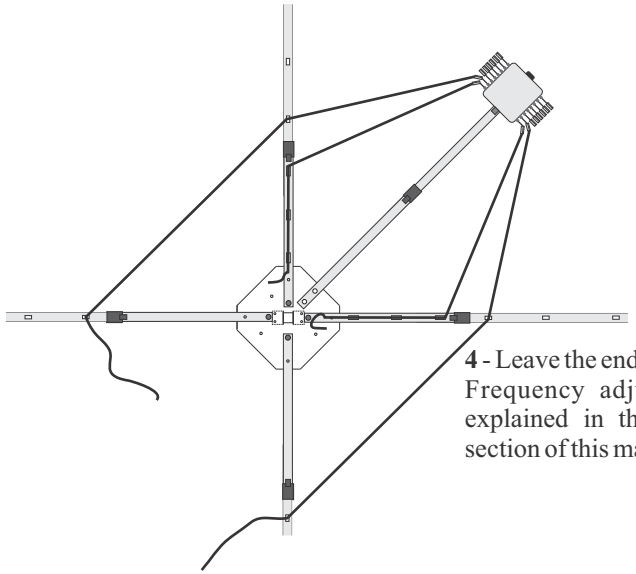
1 - 6m (WHITE) – Take the wires with the white connectors. Connect one to each white connector on both sides of the distribution box. Route each side through the clips on the central tubes, as shown in the illustration.



2 - Leave the ends loose. Frequency adjustment will be explained in the "Adjustments" section of this manual.

Attention: 10- through 40-meter bands, connect the wires to the corresponding connector and hang the loop on the hook of the band distribution box.

3 - 10m (GRAY) – Take the wires with the gray connectors. Connect one to each gray connector on both sides of the distribution box. Route each side through the clips on the 1" (25.4mm) tubes, as shown in the illustration.



4 - Leave the ends loose. Frequency adjustment will be explained in the "Adjustments" section of this manual.