Delta antenna (3–30 MHz, 200 W PEP)

CODAN

INSTALLATION

Overview

The delta antenna is a high performance, omnidirectional, broadband antenna that is suited to base-to-base or base-to-mobile communication over short to medium-range distances (see Figure 1 on page 2).

The RF connection uses a UHF-type socket mounted on the bottom of the balun housing. The balun is mounted on the mast at 1.8 m above ground level. You must make provisions for this connection at the site.

This antenna requires a 15 m mast (Codan part number 15-00422-015).

CAUTION Some parts of the antenna must be attached to the mast before the mast is raised.

Unpacking the delta antenna

A complete delta antenna is packaged in one cardboard carton and one plastic tube.

The delta antenna comprises:

- 2 sets of antenna wires (feed wing, radiating wing, terminating tail wire, anchor ropes)
- 1 balun (with mounting plate, 2 U-bolts, 4 D-shackles)
- 1 load tube (with 2 D-shackles, 1 bow shackle)
- 4 short spreaders (2 per feed wing)
- 2 long spreaders with anti-sway yokes (1 per radiating wing)
- 30 m of 6 mm polypropylene rope with rope splices
- 1 accessory bag (includes 6 rope grips, 16 split pins, conductive grease)

NOTE The mast, gibbet arm and pulleys, and coaxial cable are not supplied with the antenna.

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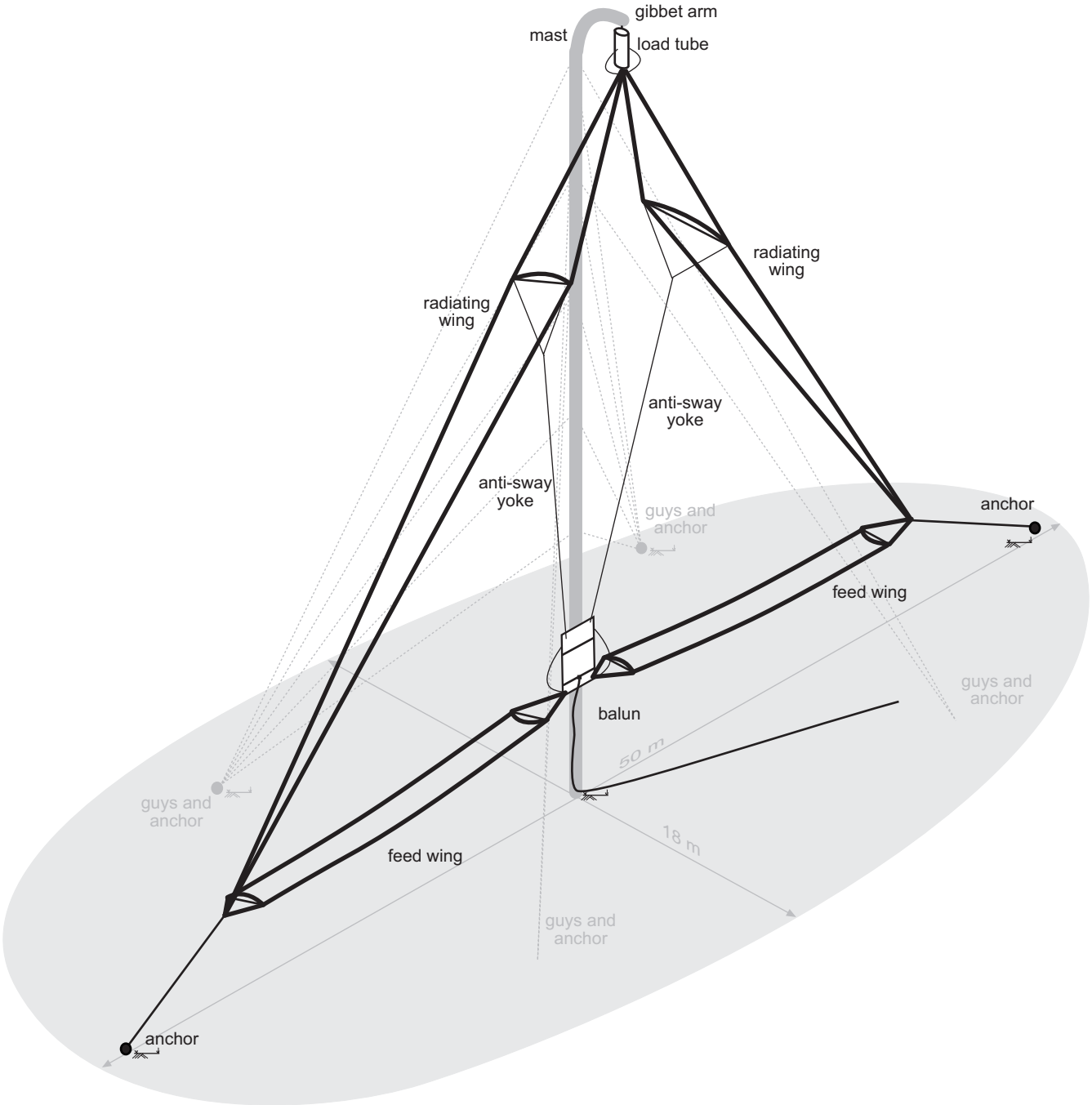
Additional equipment

The following equipment is required in addition to the antenna pack:

- mast, gibbet arm, pulleys, pull-rope
- RG213 coaxial cable
- self-amalgamating tape

Installing the delta antenna

Figure 1: Delta antenna



Connecting the delta antenna to the balun mounting plate and the load tube

To connect the delta antenna:

- ❑ Determine the location and orientation of the antenna to suit the site (see Figure 2 and Figure 3).

  NOTE — If a guyed mast is used, the guys should be made from electrically insulating material. If the guys are made from metal they should be segmented by suitable strain insulators.

- ❑ Install RG213 coaxial cable to an appropriate location near the base of the mast.

  A UHF-type plug is required on the coaxial cable. This connects to the UHF-type socket on the balun. When mounted on the mast, the balun is 1.8 m above the ground.

  NOTE — If possible, install the cable underground in a weather-proof conduit.

  NOTE — It is recommended that lightning arresters are installed in the coaxial cable at the base of the antenna and at the entry point to the building where the equipment is housed.

Figure 2: Plan view of the installation

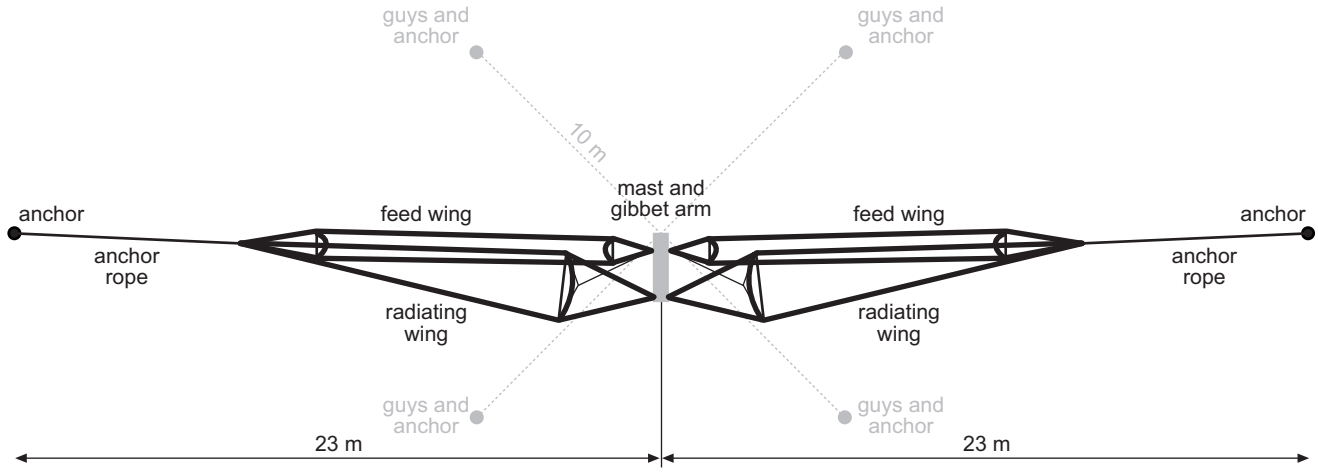
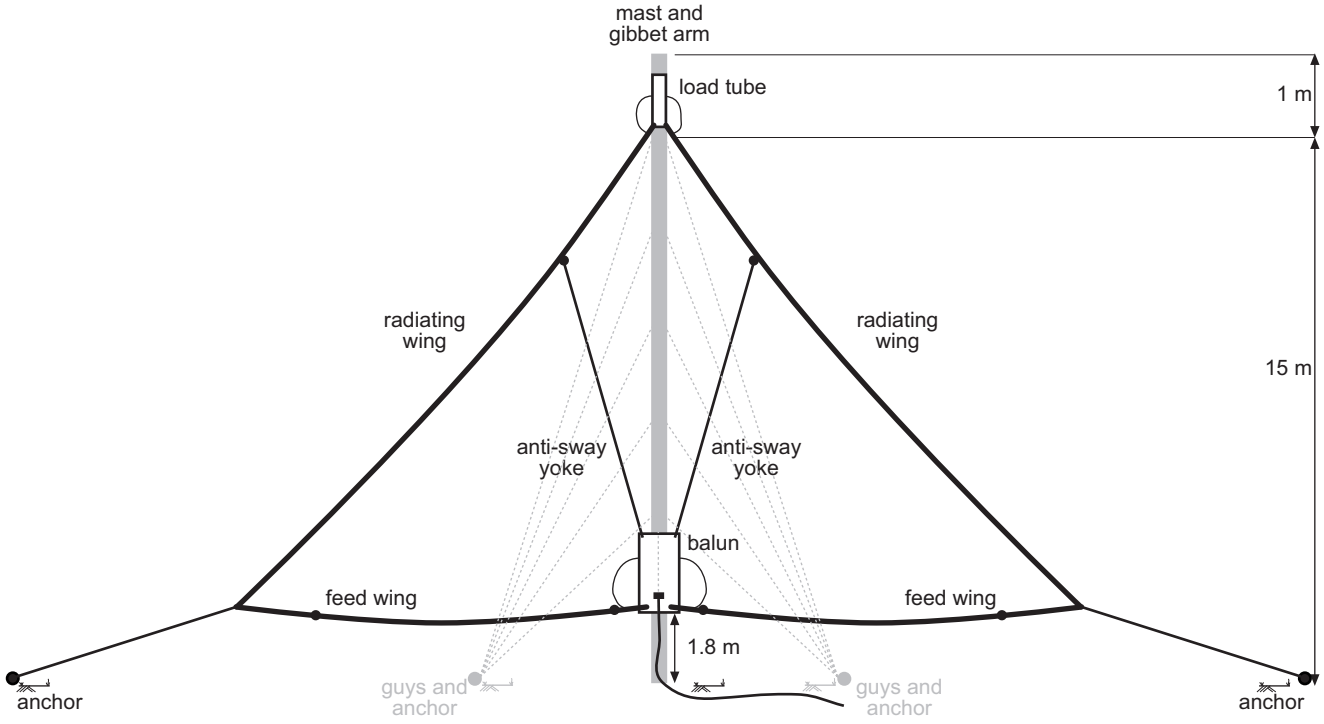


Figure 3: Elevation of the installation



- ❑ Assemble the mast, gibbet arm and pulleys according to the manufacturer's instructions. Align the gibbet arm to intersect the angle between two sets of guys.
- ❑ Attach a pulley to the outer end of the gibbet arm using a D-shackle.
- ❑ Tie a pull-rope to the polypropylene rope, then thread the pull-rope down the centre of the mast.

  The polypropylene rope must be located on the outside of the mast.
- ❑ Tie off the pull-rope and polypropylene rope temporarily to the bottom of the mast.
- ❑ Raise and secure the mast with guys according to the manufacturer's instructions.
- ❑ Use the U-bolts on the balun mounting plate to attach it to the mast so that the bottom of the plate is at a height of 1.8 m above the ground, directly below the plane of the gibbet arm.

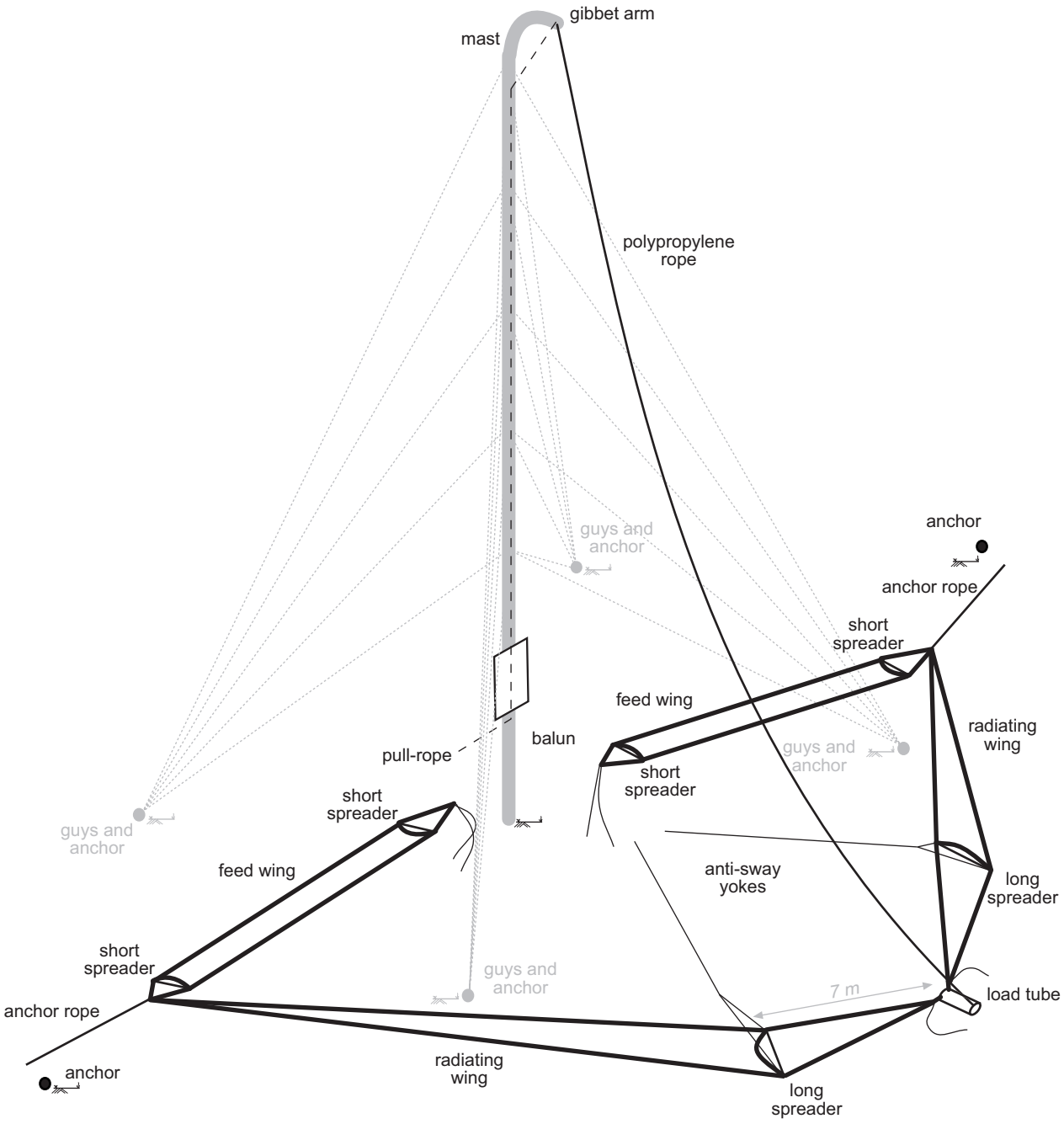
  NOTE The UHF-type socket on the balun must face downwards.

  CAUTION Do not overtighten the U-bolts on the mounting plate.

- ❑ Unroll each set of antenna wires, laying them out straight, then orientating as shown in Figure 4 on page 5.

  CAUTION Take care not to damage the porcelain insulators.

Figure 4: Laying out the antenna wires



- ❑ Connect the inner end of each feed wing to the corresponding lower hole on the balun mounting plate using the D-shackle provided (see Figure 5 on page 6).

CAUTION When hoisted, the feed wings must be in the horizontal plane for effective operation.

CAUTION *Do not* connect the terminating tail wires to the porcelain insulators on the balun; these are attached after the antenna is raised and a measurement is taken.

Figure 5: Connections to the balun mounting plate

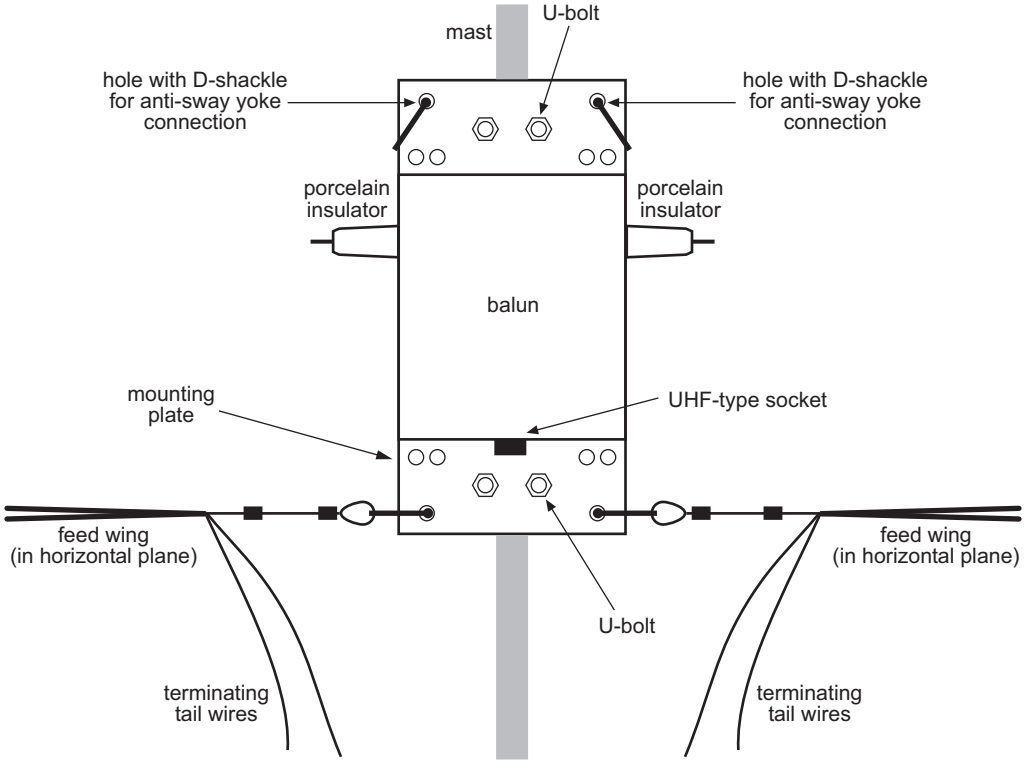
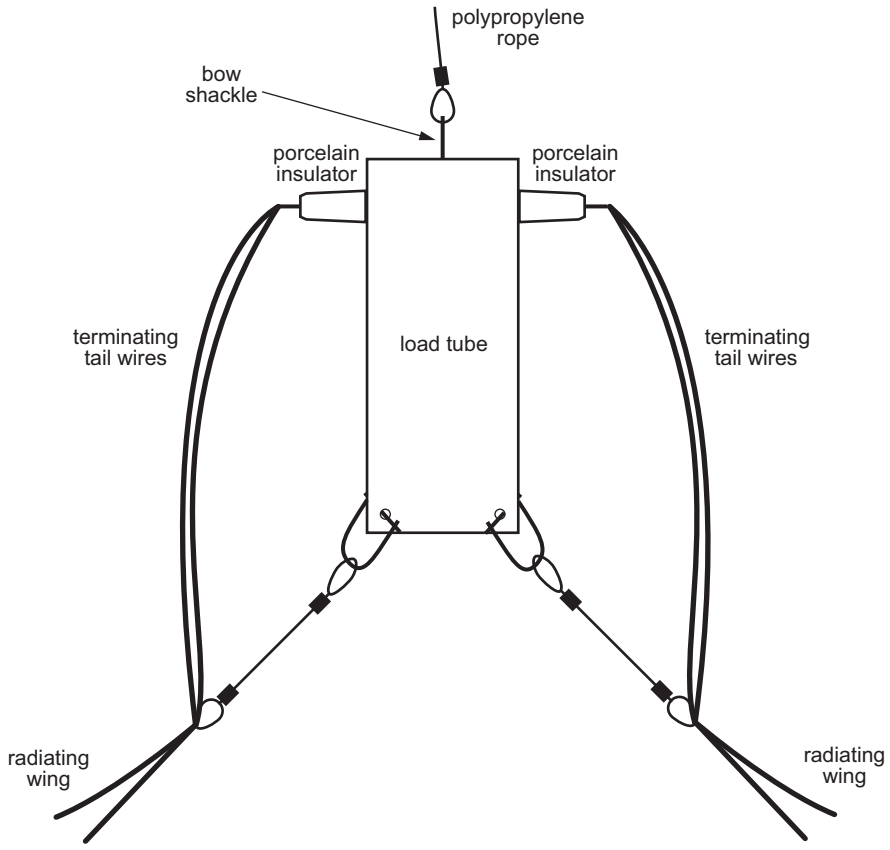


Figure 6: Connections to the load tube



- ❑ Connect the polypropylene rope to the top of the load tube using the bow shackle provided (see Figure 6 on page 6).
- ❑ Connect each radiating wing to the corresponding D-shackle at the bottom of the load tube.
- ❑ Connect the terminating tail wires to the corresponding porcelain insulator on the load tube using two 8 mm AF spanners to prevent the inner nut from rotating.

  WARNING Ensure that the terminating tail wires to not touch the load tube.

- ❑ Cut a very small hole in the corner of the packet of conductive grease.
- ❑ Apply a small amount of conductive grease to each connection between the tail wires and the insulators.
- ❑ Attach a long spreader to each of the radiating wings by fitting it over the crimped ferrules that are approximately 7 m from the connection of the radiating wing to the load tube (see Figure 4 on page 5).
- ❑ Fix each long spreader in place at each end using the split pins provided in the accessory bag.
- ❑ Ensure the anti-sway yoke attached to each long spreader is positioned so that it will hang below the radiating wing when the antenna is raised.
- ❑ Attach a short spreader to each end of the feed wings by fitting it over the crimped ferrules that are approximately 600 mm from each end of the feed wings (see Figure 4 on page 5).
- ❑ Fix each short spreader in place at each end using the split pins provided in the accessory bag.

Raising and tensioning the delta antenna

To raise and tension the delta antenna:

- ❑ Slowly raise the antenna using the pull-rope and polypropylene rope until it is 2 m from the top of the mast.

  NOTE Continuously check that the antenna wires are not tangled or twisted, and that the anti-sway yokes hang below the antenna wires.

- ❑ Secure the polypropylene rope to the mast loosely using two of the rope grips provided in the accessory bag.
- ❑ Use two of the rope grips to connect each anchor rope to its corresponding anchor point, applying enough tension to lift the feed wings from the ground.
- ❑ Secure each anchor rope loosely.
- ❑ Increase the tension on the polypropylene rope and/or the anchor rope on each side of the antenna until:
  - each feed wing is horizontal and sags approximately 300 mm in the centre, and
  - each radiating wing sags approximately 1 m at the long spreader

- ❑ Tighten all rope grips.
- ❑ Attach the anti-sway yoke from each radiating wing to the corresponding top hole in the balun mounting plate using the D-shackle provided (see Figure 5 on page 6).

  NOTE Only a small amount of tension is required on the anti-sway yokes as some sideways movement is desirable to improve the mechanical life of the antenna.

- ❑ Untie the pull-rope from the polypropylene rope and retain for future lowering and raising of the antenna.

Connecting the balun to the delta antenna and the RF source

To connect the balun into the antenna system:

- ❑ Measure the resistance between the terminating tail wires from the feed wings.

  The resistance should measure 600 Ω ±100 Ω. If not, check the connections to the load tube.

- ❑ Connect the terminating tail wires from each feed wing to the corresponding porcelain insulator on the balun (see Figure 3 on page 4) using two 8 mm AF spanners to prevent the inner nut from rotating.

  WARNING Ensure that the terminating tail wires to not touch the balun.

- ❑ Apply a small amount of conductive grease to each connection between the tail wires and the insulators.
- ❑ Connect the RF cable to the balun, then tighten.
- ❑ Apply self-amalgamating tape to the RF connection to seal it against water ingress.
- ❑ Connect the earth for the mast to a suitable ground stake.

Maintenance

The area around the antenna must be kept clear of foliage.

The antenna should be inspected a short time after installation and re-tensioned if necessary. The installation should be inspected every 6 months.