

# Delta antenna (3–30 MHz, 200 W PEP)

## 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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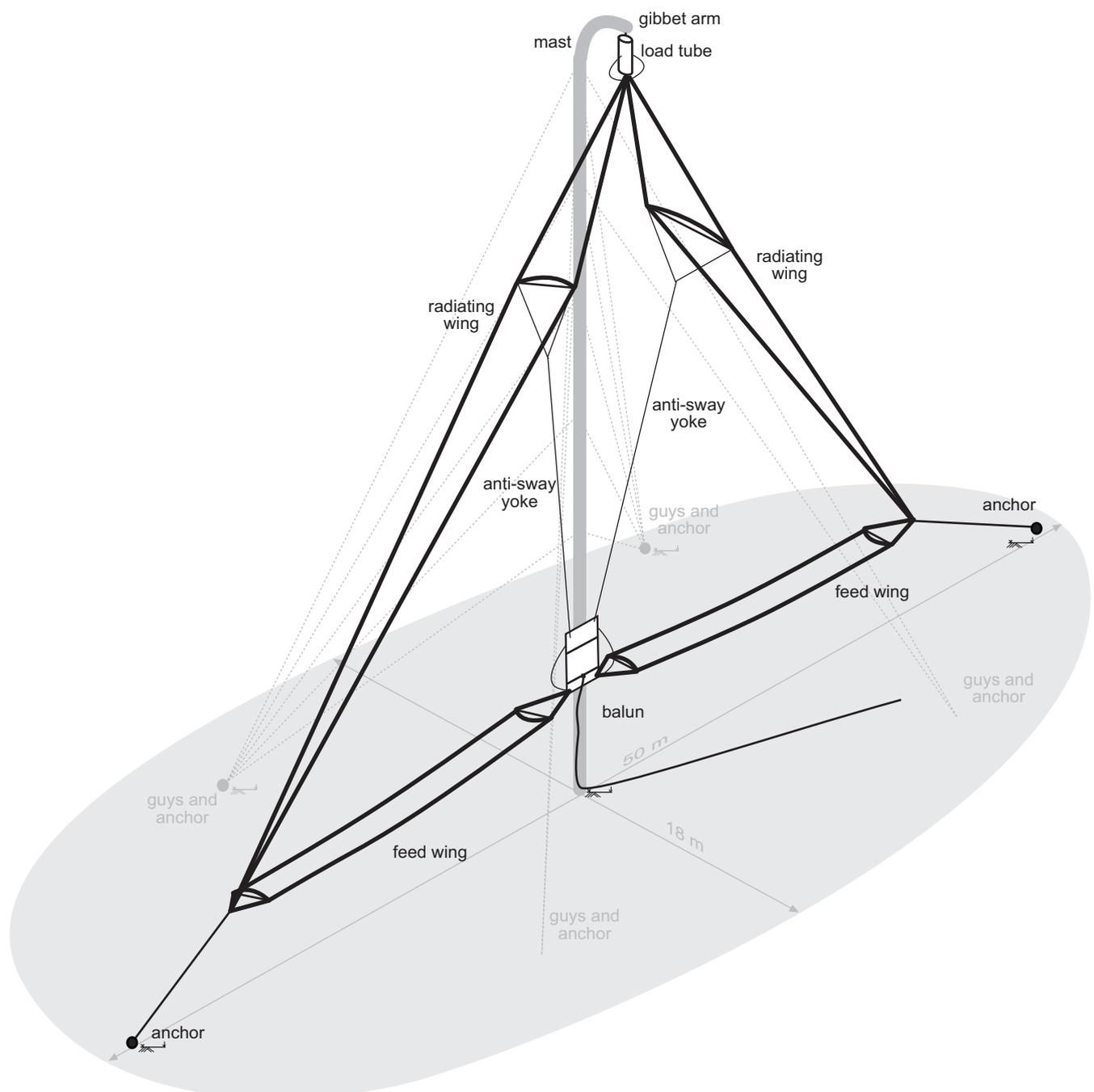
## Additional equipment

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

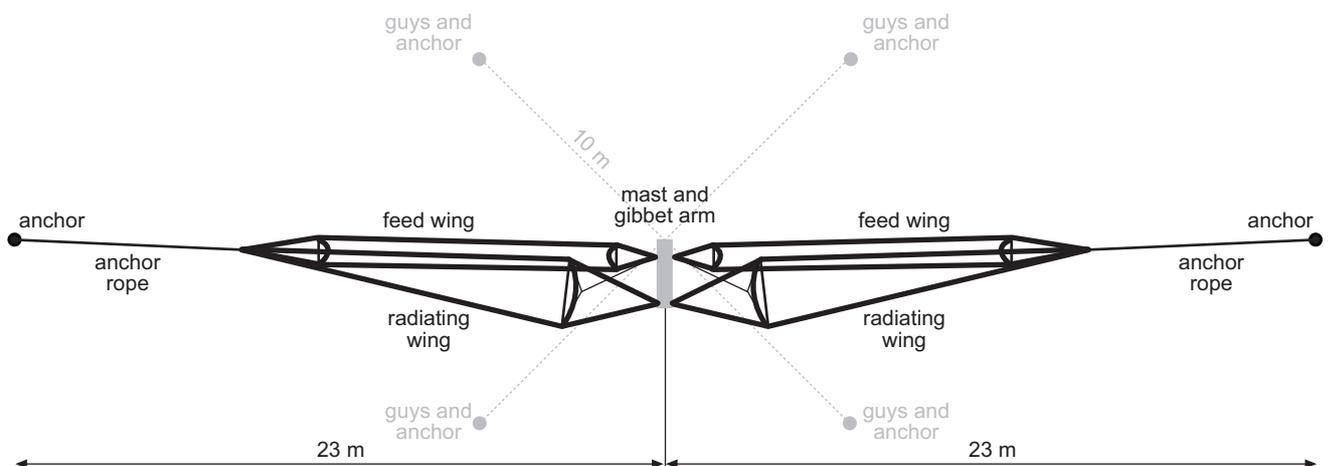
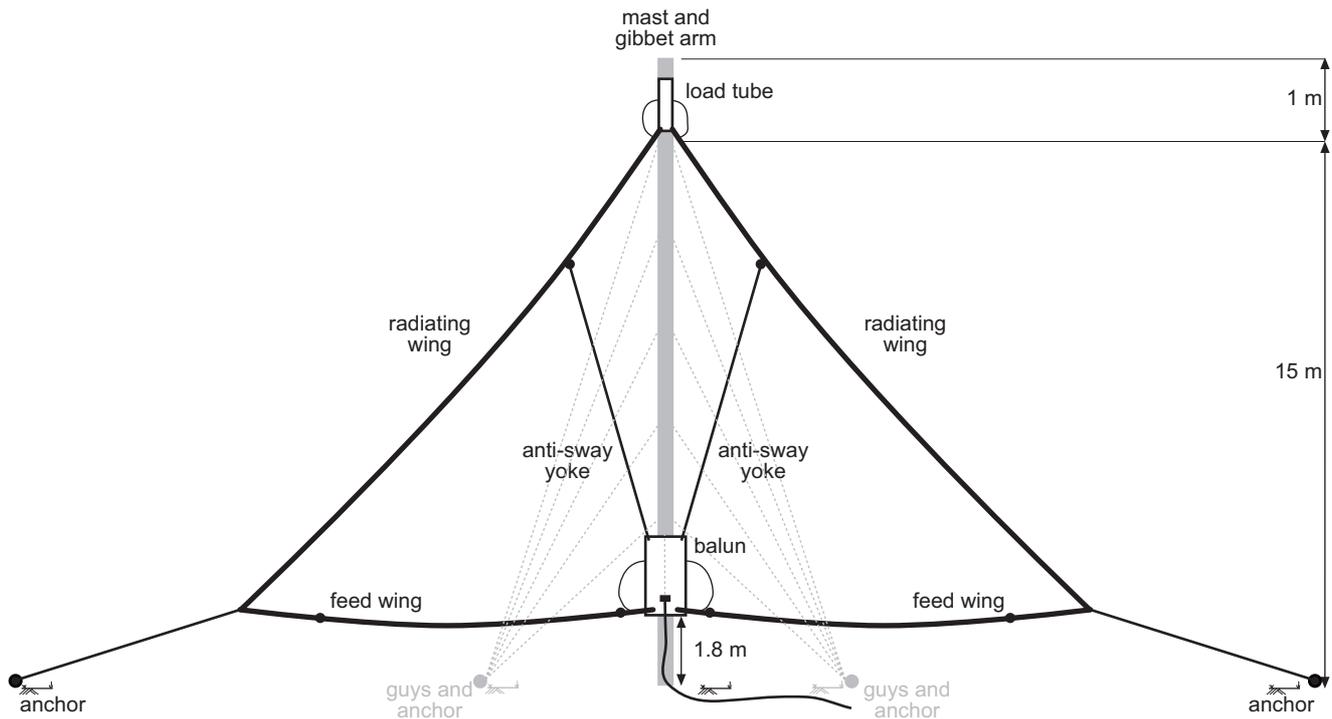


Figure 3: Elevation of the installation



- 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.

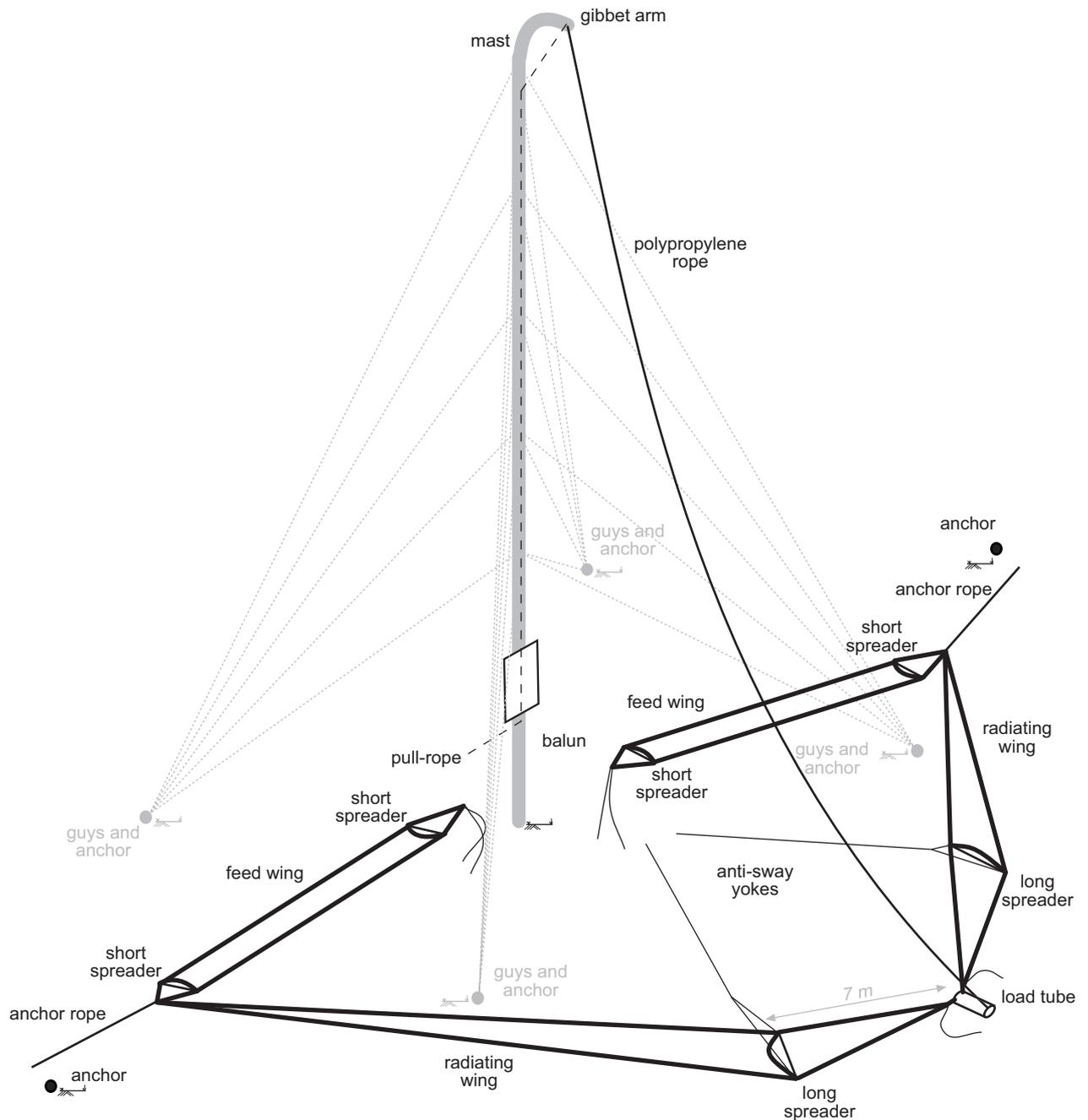
**NOTE** The UHF-type socket on the balun must face downwards.

**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

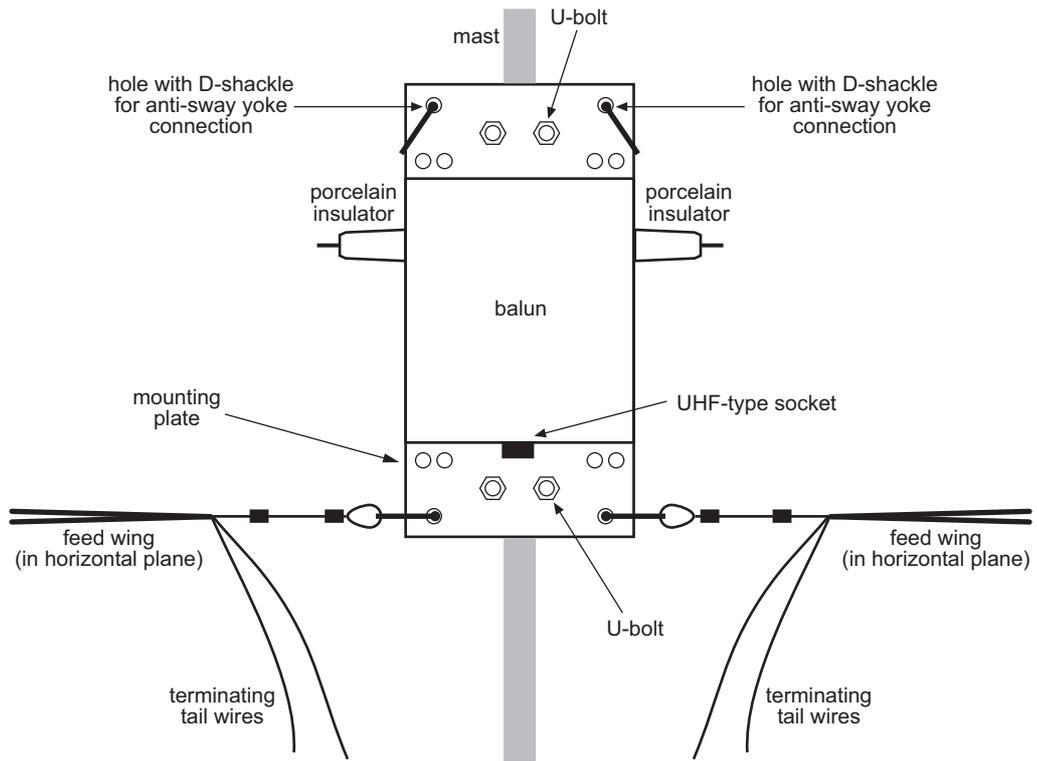
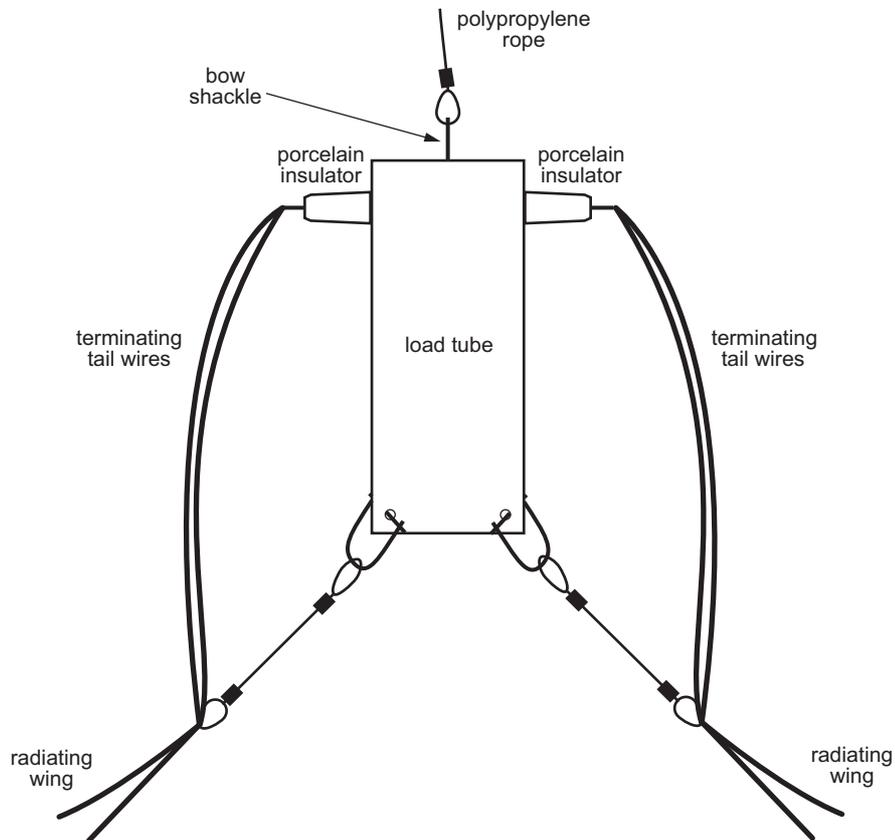


Figure 6: Connections to the load tube



- 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 do 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  $600\ \Omega \pm 100\ \Omega$ . 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 do 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.