

C463 Multiwire Broadband Dipole Antenna (2–30 MHz)

Introduction

The C463 Multiwire Broadband Dipole Antenna is available in the following power ratings:

Power rating	Codan part number
250 W PEP	15-00463-001
500 W PEP	15-00463-002
1 kW PEP	15-00463-003

The antenna is designed for fixed station multi-frequency operation. These instructions apply to all power ratings of this antenna.

There is a glossary of terms at the end of these instructions.

The C463 antenna is suitable for erection in the inverted V or horizontal configuration. The inverted V configuration requires only one main mast, however the horizontal configuration is more efficient. For both configurations, a main mast height of 9 to 10 m is adequate, providing optimal communications over a short distance (0 to 600 km). Long-distance communications require a taller main mast of 15 m. The horizontal configuration is recommended for this distance.

NOTE The minimum required height of the main mast is 6 m.

The C463 antenna is packed completely assembled, ready for erection. The parallel wires of the antenna are raised in the horizontal plane, regardless of the configuration used. In some instances, the antenna is supplied with a coaxial cable for use with the installed antenna. If you are supplying your own coaxial cable, the connectors must be PL259 UHF-style.

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Installing a C463 antenna in an inverted V configuration

The C463 antenna may be erected using the gibbet included with a Codan mast (mast gibbet), or using the gibbet included with the antenna (antenna gibbet). This gibbet may be attached to any mast.

NOTE The type of gibbet used affects the layout of the antenna prior to erection.

Figure 1: Inverted V configuration using the mast gibbet

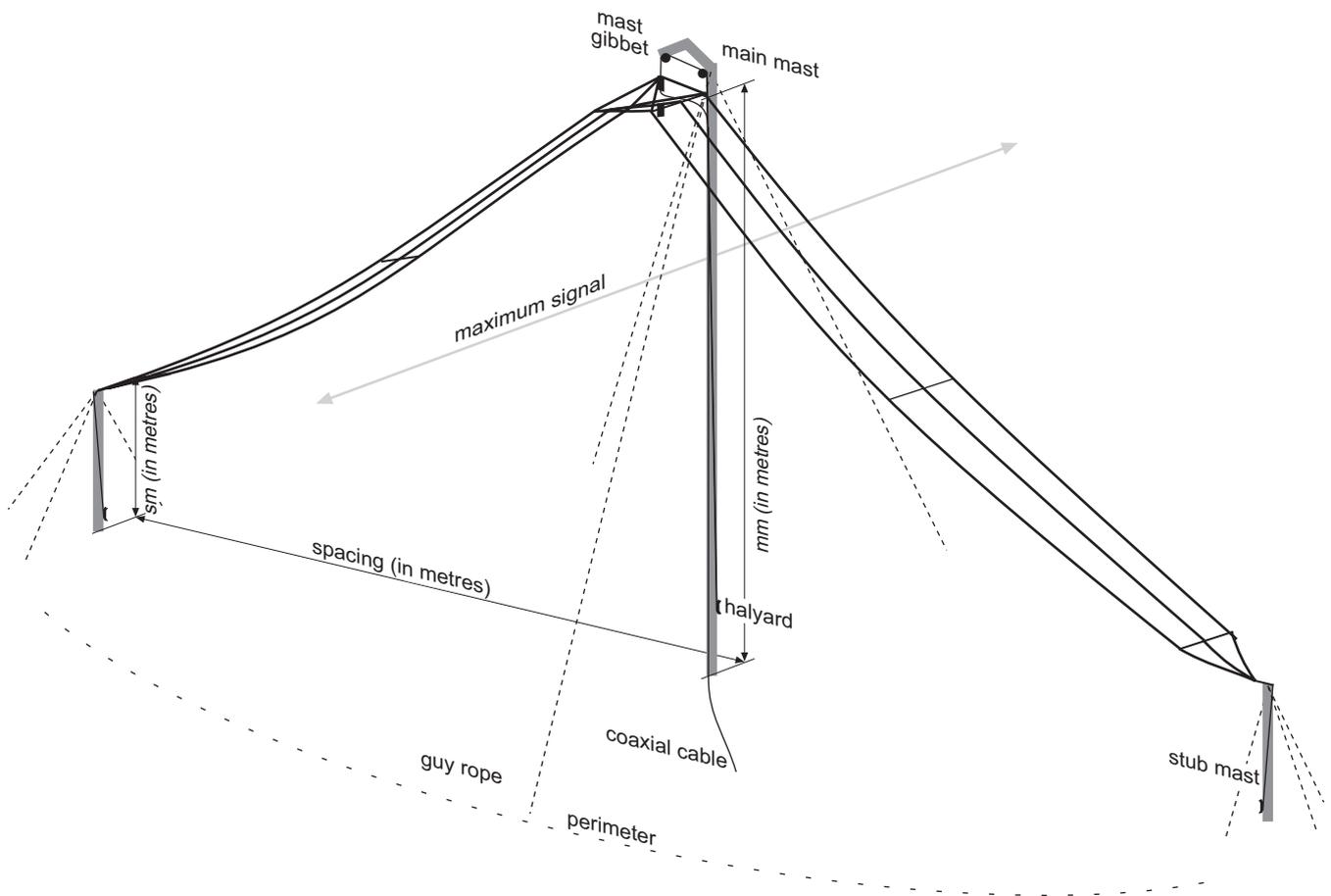
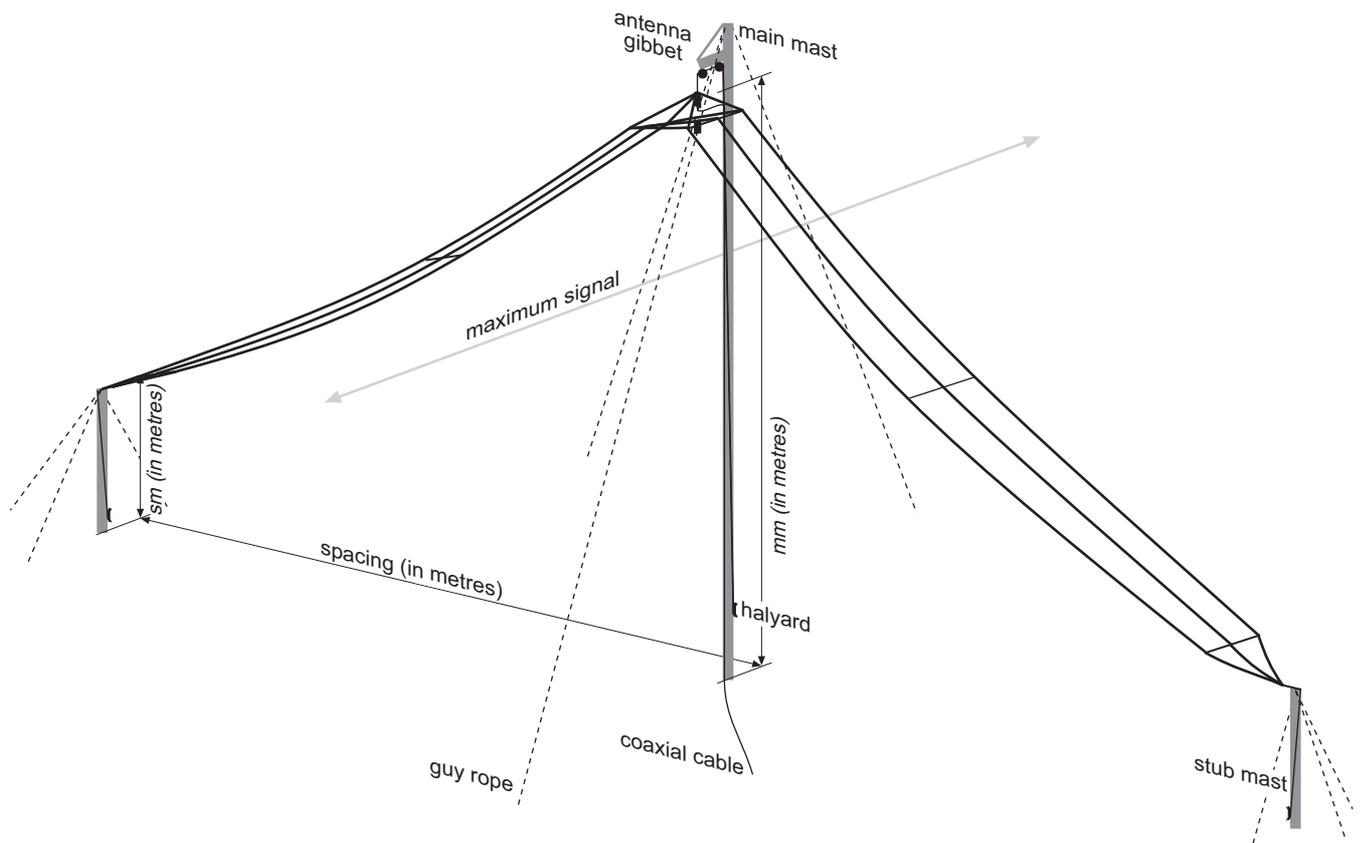


Figure 2: Inverted V configuration using the antenna gibbet



Spacing and height

The spacing between the main mast and the stub masts in the inverted V configuration is determined by the following equation:

$$\text{Spacing} = 1 + \sqrt{196 - (\text{mm} - \text{sm})^2}$$

All spacings and heights of the main mast (mm) and stub masts (sm) are in metres.

For example, an installation using a main mast height of 10 m and stub masts of 3 m requires a spacing of 13 m between masts. Therefore, the overall installation requires 26 m, plus allowances for guy ropes.

Orientation

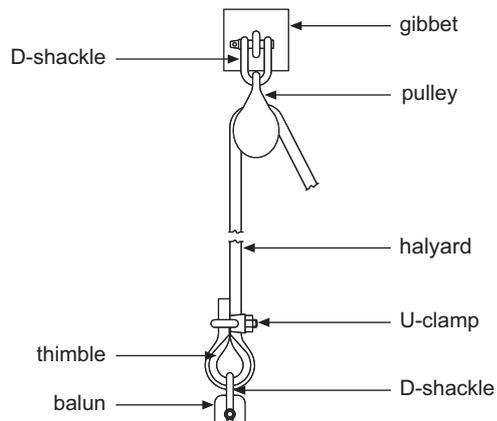
For effective communications, the line of the antenna wires, and therefore the masts, should be at right angles to the preferred direction of propagation.

Guy ropes

If the masts are guyed, the guys should not be located beneath the antenna, so that they do not interfere with the raising and lowering of the antenna. If metallic guys are used, it is recommended these be broken up with ‘egg’ insulators at regular intervals to shorten the effective wavelength of each wire, and thus reduce any degradation to the antenna radiation pattern.

Attaching the antenna to the main mast

Figure 3: Support arrangement for the inverted V configuration



CAUTION Do not erect the main mast until the pulleys and halyard are in place.

To attach the antenna to the main mast:

- If required, attach the antenna gibbet to the mast.
- Attach a pulley using a D-shackle to the outer end of the gibbet, and another at a point close to where the gibbet is attached to the main mast.
- Position the pulleys so that a halyard can run from one pulley to the other, then down the main mast.
- Cut 2 × 3 m lengths of halyard from the main halyard.
These are used for tying the ends of the antenna to the stub masts.
- Run the halyard from the base of the main mast to the top, through the pulleys and back to the base again, then tie the two ends together.
- Erect the main mast.
- Do one of the following:
 - If you are using the mast gibbet, lay the antenna outside the perimeter of any guy ropes, on the same side as the gibbet (see [Figure 1 on page 2](#)).
 - If you are using the antenna gibbet, lay the antenna within the guy ropes, on the same side as the gibbet (see [Figure 2 on page 3](#)).

- Carefully separate the two halves of the antenna without cutting any plastic cable ties that hold the antenna wires in place in the packaging.
- Orient the antenna parallel to the intended line of installation.
- Ensure that the wires connecting the balun to the centre spreaders are above the main antenna wires.
- Thread the halyard around the thimble, then secure the halyard with the U-clamp.
- Connect the thimble to the balun using a D-shackle.
- Working on one of the four antenna sections at a time, cut the plastic cable ties that secure the section, then carefully extend each out.

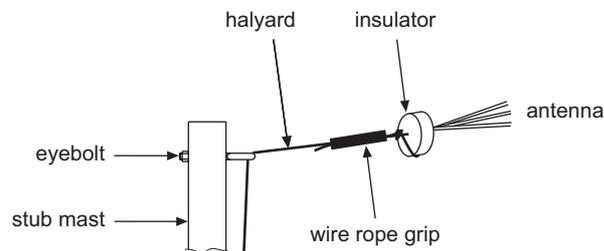
CAUTION Take care not to tangle the wires. Do not cut any of the wires.

- Raise the centre of the antenna a couple of metres off the ground, then temporarily tie off the halyard to the mast.

Attaching the antenna to the stub masts

NOTE Each stub mast should be equipped with a suitable eyebolt or similar fixing for tensioning and tying off the short 3 m halyards.

Figure 4: Stub mast and antenna



To attach the antenna to the stub masts:

- Pass a 3 m halyard through the insulator at each end of the antenna, then tie it off on itself.

NOTE Ensure the knots are tight and will not come undone under tension.

- Fit a wire rope grip to secure each knot.
- Temporarily tie off the short halyards to the stub masts.
- Erect the stub masts.

Connecting the coaxial cable

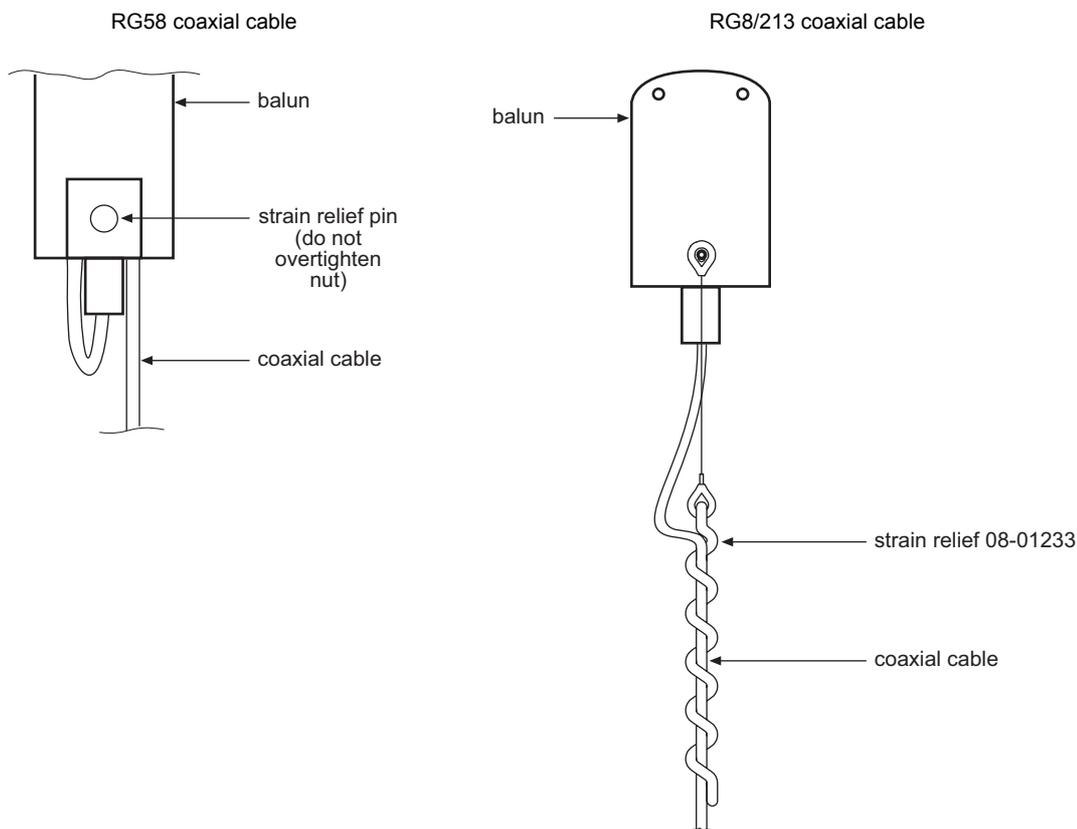
To connect the coaxial cable:

- ❑ Connect the coaxial cable to the balun.

NOTE The coaxial cable may need to pass between the load and the antenna wire nearest the mast.

- ❑ Wrap the connector with self-amalgamating PIB (Rotunda 2501) or EPR (3M Scotch™ 23) tape.
- ❑ Cover the self-amalgamating tape with an overlay of high-quality electrical tape (3M Scotch™ 33+, or similar) to minimise aging of the self-amalgamating tape.
- ❑ Provide strain relief for the coaxial cable (see [Figure 5](#)).

Figure 5: Strain relief for the coaxial cable



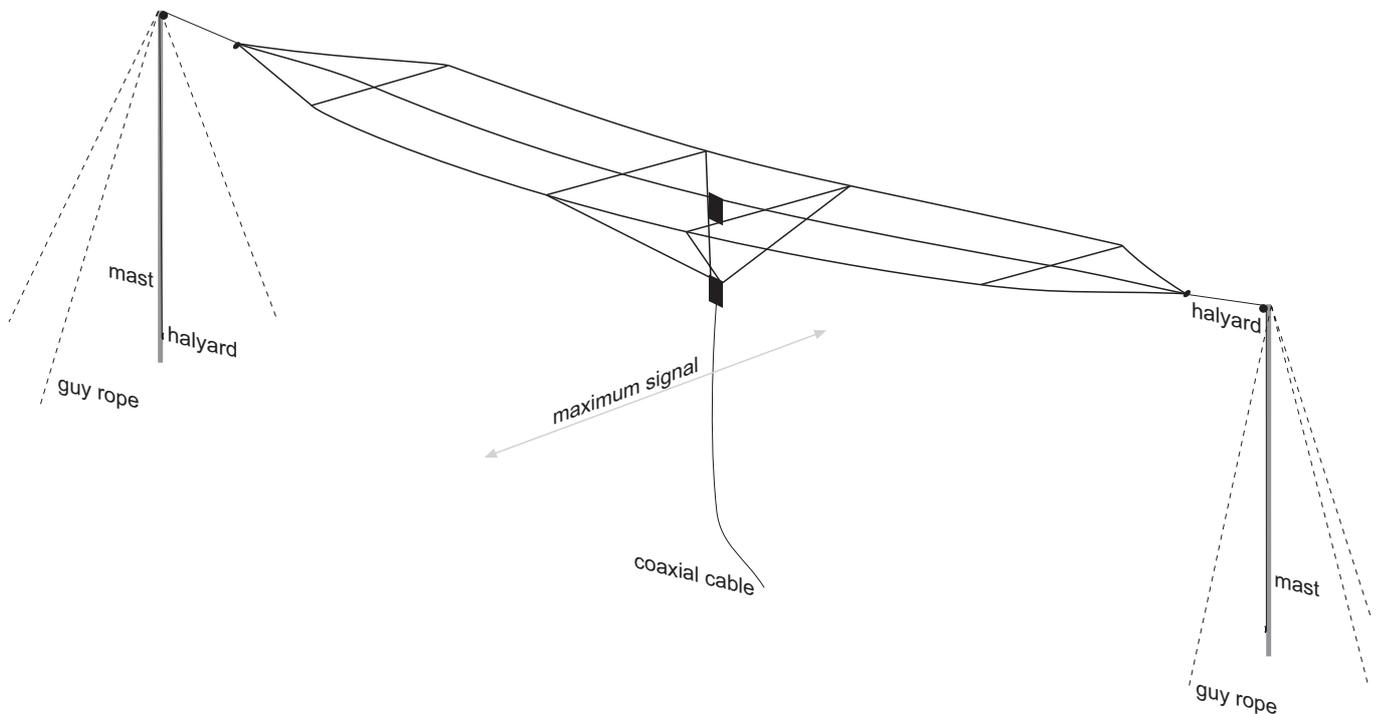
Securing the antenna

To secure the antenna:

- Carefully raise the antenna up the main mast, making sure that the terminating load hangs below the antenna.
- When fully raised and the halyard is tied off, attach the coaxial cable to the mast so that it is clear of the antenna wires.
- Tighten and tie off the halyards on each stub mast, allowing a sag of approximately 200 mm in each half.

Installing a C463 antenna in a horizontal configuration

Figure 6: Horizontal configuration



Spacing and height

The minimum distance between masts is 30 m.

The minimum height of the installed antenna is 6 m. Heights of 9 to 15 m provide better communications; the higher the antenna, the longer the communication range.

Orientation

For effective communications, the line of the antenna wires, and therefore the masts, should be at right angles to the preferred direction of propagation.

Guy ropes

If the masts are guyed, the guys should not be located beneath the antenna, so that they do not interfere with the raising and lowering of the antenna. If metallic guys are used, it is recommended these be broken up with ‘egg’ insulators at regular intervals to shorten the effective wavelength of each wire, and thus reduce any degradation to the antenna radiation pattern.

Attaching the antenna to the masts

CAUTION Do not erect the masts until the pulleys and halyards are in place.

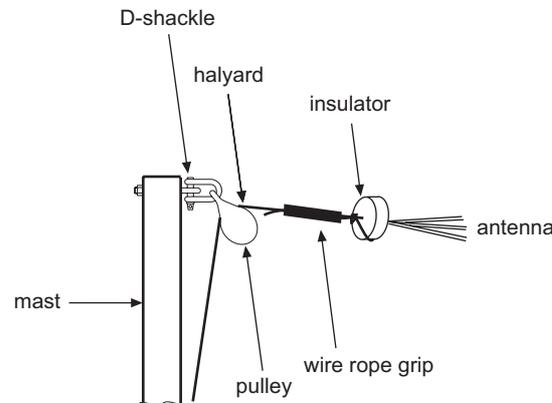
To attach the antenna to the masts:

- Attach a pulley using a D-shackle to the top of each mast.
- Cut the main halyard into two equal lengths.
- Run one length of the halyard from the base of the mast to the top, through the pulley and back to the base again, then tie the two ends together.
- Erect the mast.
- Repeat this procedure for the second mast.
- Lay the antenna midway between the masts.
- Carefully separate the two halves of the antenna without cutting any plastic cable ties that hold the antenna wires in place in the packaging.
- Orient the antenna parallel to the intended line of installation.
- Ensure that the wires connecting the balun to the centre spreaders are below the main antenna wires, and that the terminating load will hang above the balun when the antenna is installed.
- Working on one of the four antenna sections at a time, cut the plastic cable ties that secure the section, then carefully extend each out.

CAUTION Take care not to tangle the wires. Do not cut any of the wires.

Attaching the antenna to the masts

Figure 7: Masts and antenna



To attach the antenna to the masts:

- Pass a halyard through the insulator at each end of the antenna, then tie it off on itself.

NOTE Ensure each knot is tight and will not come undone under tension.

- Fit a wire rope grip to secure each knot.
- Raise both ends of the antenna approximately 1.5 m above the ground.

Connecting the coaxial cable

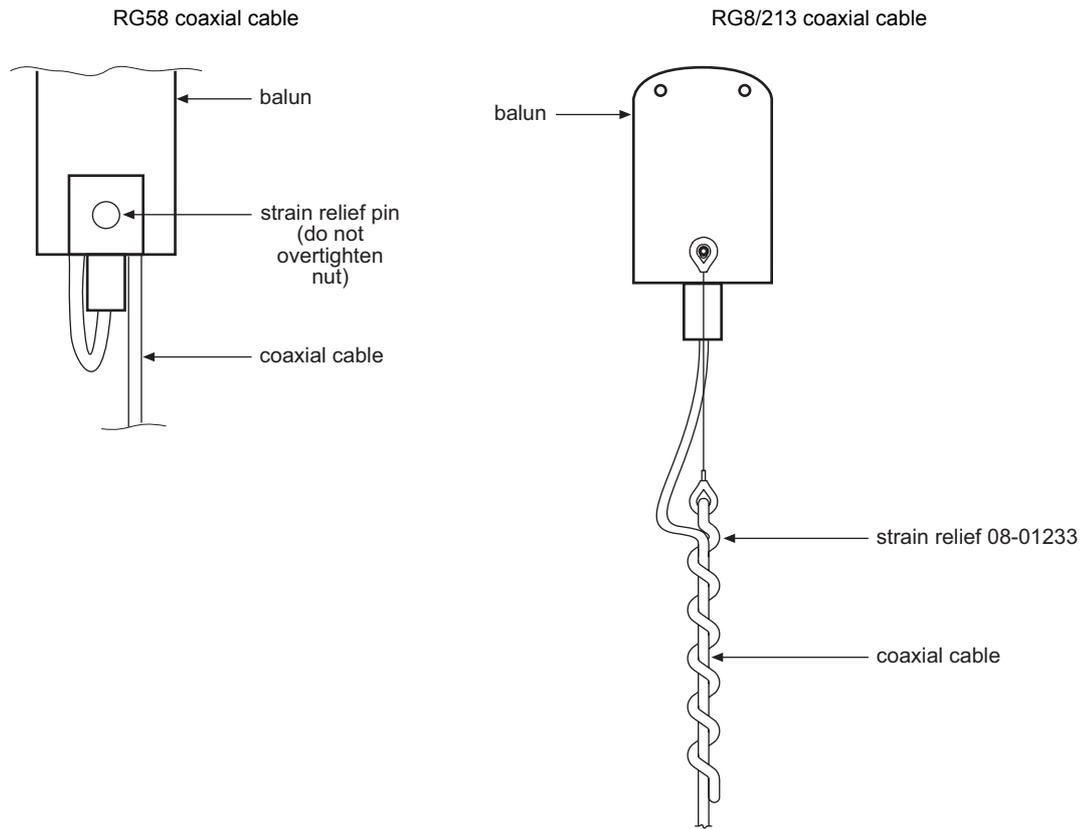
To connect the coaxial cable:

- Connect the coaxial cable to the balun.

NOTE The coaxial cable should hang clear of the antenna.

- Wrap the connector with self-amalgamating PIB (Rotunda 2501) or EPR (3M Scotch™ 23) tape.
- Cover the self-amalgamating tape with an overlay of high-quality electrical tape (3M Scotch™ 33+, or similar) to minimise aging of the self-amalgamating tape.
- Provide strain relief for the coaxial cable (see [Figure 8](#)).

Figure 8: Strain relief for the coaxial cable



Securing the antenna

To secure the antenna:

- Raise the antenna to the top of the masts, then adjust the halyards so that the antenna is equidistant between the masts, allowing a sag of approximately 400 mm in the centre.

NOTE Tie off the halyards each time to minimise problems.

Reasonable tension needs to be applied to the halyards to level the antenna between the masts and account for flexing of the mast.

- Tie off the halyards at completion.

Maintenance

The antenna should be checked every six months for wear and tear. In particular, the condition of the rope halyards should be inspected, especially in areas where the rope may have moved on the pulley. This will involve lowering the antenna. All terminations should also be checked as well as the condition of the coaxial cable.

Glossary

This term...	Means...
PEP	peak envelope power
terminating load	A device used to dissipate RF energy that is not radiated during communications.
balun	A device that connects a coaxial cable to an antenna.
broadband antenna	An antenna that covers a range of frequencies and that does not require tuning.