



TZ-RD-34 30m/40m Rotary Dipole Installation Manual

The TZ-RD-34 is a loaded dipole antenna for the 40m band and a full size rotary dipole for the 30m band. The antenna uses an aluminium radiating section and two loading coils to permit performance on two frequency bands. All hardware supplied is stainless steel to cope with aggressive environmental conditions except for the mounting U bolts which are optionally supplied at slightly extra cost as stainless steel.

The antenna uses high efficiency loading coils located close to the feed point so that only a small inductance is required but at sufficient distance from the feed point to ensure the input impedance of the antenna is not too low. The loading coils are protected by covers to prevent bird damage and are sealed to prevent moisture ingress.

Shorting bars are provided to permit the loading coils to be easily shorted thus permitting the antenna to operate on the 30m band. The shorting straps can be attached to optional relays which permit remote two band operation to be accomplished. DC power is provided via the coaxial feedline and a switch box so that no cabling, other than that supplied, and the coaxial feeder is required. Furthermore, tuning sections are

provided at the centre of the antenna so that minor final tuning of the resonant frequency can be achieved from the tower or support if the antenna is mounted directly to the mast.

Heavy wall tubing is used to provide superior strength and durability.

The antenna has a large bandwidth capable of being tuned for a maximum VSWR of less than 2.0:1 across 250 kHz of the 40m band and the whole of the 30m band. When mounted at 15m or greater the antenna will perform significantly better than a vertical for DX contacts.

The antenna may be mounted on a separate tower or mast to other HF antennas or mounted on the same tower or support as your 10/15/20m tri-bander or other antenna as long as a vertical separation of 2m or greater is used. If smaller spacing is used the VSWR and radiation pattern of the TZ-RD-34 or other antennas on the support may be degraded

When mounted at heights of 15m or greater, in the clear, the antenna is extremely efficient and offers excellent low angle radiation for DX communications.

Supplied Equipment

The following equipment and/or facilities are supplied with the TZ-RD-34 antenna:

Radiating element:	Radiating section – Various sleeved aluminium sections.
Traps	(2) Two loading coils within the centre elements.
Adjustment hose clamps	(6) Six stainless steel hose clamps, 32mm, 25mm and 15mm.
Loading Coil Shorts	(4) Four shorting sections.
Mounting bracket	Aluminium mounting bracket attached to a support pipe or tube.
Mounting hardware	(2) 50mm galvanised steel U bolts.
Instruction Manual	This document.

Optional Equipment

Balun	(1) HF 1:1 Balun, TZ-1840 or equivalent. A balun is recommended to prevent feed line radiation which may impair the radiation pattern, VSWR or cause TVI.
Stainless Steel U Bolts	(2) Stainless Steel 50mm U bolts are supplied instead of the two (2) 50mm galvanised U bolts for mounting the vertical on a pipe.
Relay Kit	Comprises (2) shorting relays, connecting cables, DC isolating Balun and Control Switch Box



Guidance for all installation types

To assist with corrosion protection for the RF connectors and radiating element connection, a layer of plastic insulation tape followed by a layer of self-amalgamating tape (bhutal rubber) tape may be used. The electrical tape assists in making removal of the self-amalgamating tape easier when maintenance is required. Use drip loops to form a single coil of cable that assists with corrosion

protection and provides stress relief for the RF coaxial feeder. Do not over tighten the radiating element connection terminal nuts. Use only enough torque to cause the spring washers to “flatten”. Further torque may crack the internal lock tight adhesive making later removal of the balun difficult. Simply “nip up” the nuts just past finger tight.

Tools Required for Assembly and Tuning.

The following tools are required to assemble the TZ-RD-34 antenna:

- a. Flat blade screwdriver,
- b. No. 2 Phillips Head Screwdriver
- c. M6 and M5 allen keys,
- d. 13mm open ended spanner,
- e. 3/8 inch spanner, and
- f. VSWR Meter or antenna analyser.

Warning Electrocution Hazard

When installing this antenna be sure not to come into contact with overhead electrical power lines which may not be insulated. Contact with uninsulated overhead powerlines whilst installing or operating this antenna may lead to *serious injury* or *death*. DO NOT INSTALL this antenna in a location where mechanical failure of the support or antenna may allow the antenna or support structure to fall onto or come into contact with overhead electrical power lines.

Check the supplied parts.

Locate all the components and check that all hardware has been supplied with your antenna. If any item is missing please contact RippleTech

Electronics for a replacement item, info@rippletech.com.au or contact your local agent or supplier.

Assembling the antenna.

Once all the components have been identified, layout the antenna on the ground. Assemble the inner sections of the antenna first. Locate the PVC clamps that secure the innermost tube sections to the insulators of the centre mount.

Secure the insulating blocks to the centre mounting aluminium bracket using the supplied M6 by 40mm hex head dome screws (Qty 12). Use a 3mm

allen key. Each insulating block requires three (3) screws. Use a flat washer and spring washer under each screw (qty 12 each).

Once all four (4) insulating blocks have been secured to the bracket, place the centre insulating piece between the two innermost insulating blocks in preparation for connection to the radiating element centre sections.



Locate the shorting bars. There are two (2) bars that are Left hand and two (2) bars that are right handed. Place one (1) shorting bar over each centre element and slide them up to the loading coil cover so that there is approximately 5 cm space between the coil cover and the shorting strap. Insert an M6 x 12mm phillips head screw into each strap, attach washers and nuts and loosely tighten.

Insert one of the 32mm tube sections into each side of the centre support section. Ensure that the M6 screws that clamp the element in place are loose at this point so that the element slides in easily. Insert the centre insulating block into the 32mm tube and insert the M6 x 10mm retaining screw with flat and spring washer, do not tighten yet. Insert the other 32mm section into the insulating blocks. The sections should slide into the insulating block holes and over the centre insulator.

Insert all four (4) M6 x 50mm retaining screws into the retaining clamps, 32mm tubes and insulators, refer to Figure 1 – Centre Mount Assmby Detail. Once all screws have been inserted with at least one turn, tighten each screw in turn.

Once the centre element is aligned the insulating blocks can be tightened to hold the element in place. Be careful not to over tighten the screws. The screws should be tightened $\frac{1}{4}$ to $\frac{1}{2}$ a turn past the point where the spring washer becomes flat.

The pigtails used for the TZ-RD-34 should be 10cm (4 inches) long and terminated in “eye” type terminal lugs. Pigtails are not supplied with the antenna or balun but are available separately from RippleTech Electronics or can easily be made up at home using automotive terminal lugs and 2.5mm² electrical wire. Refer to Figure 2 – Balun Connection Point for detail of the balun connection points

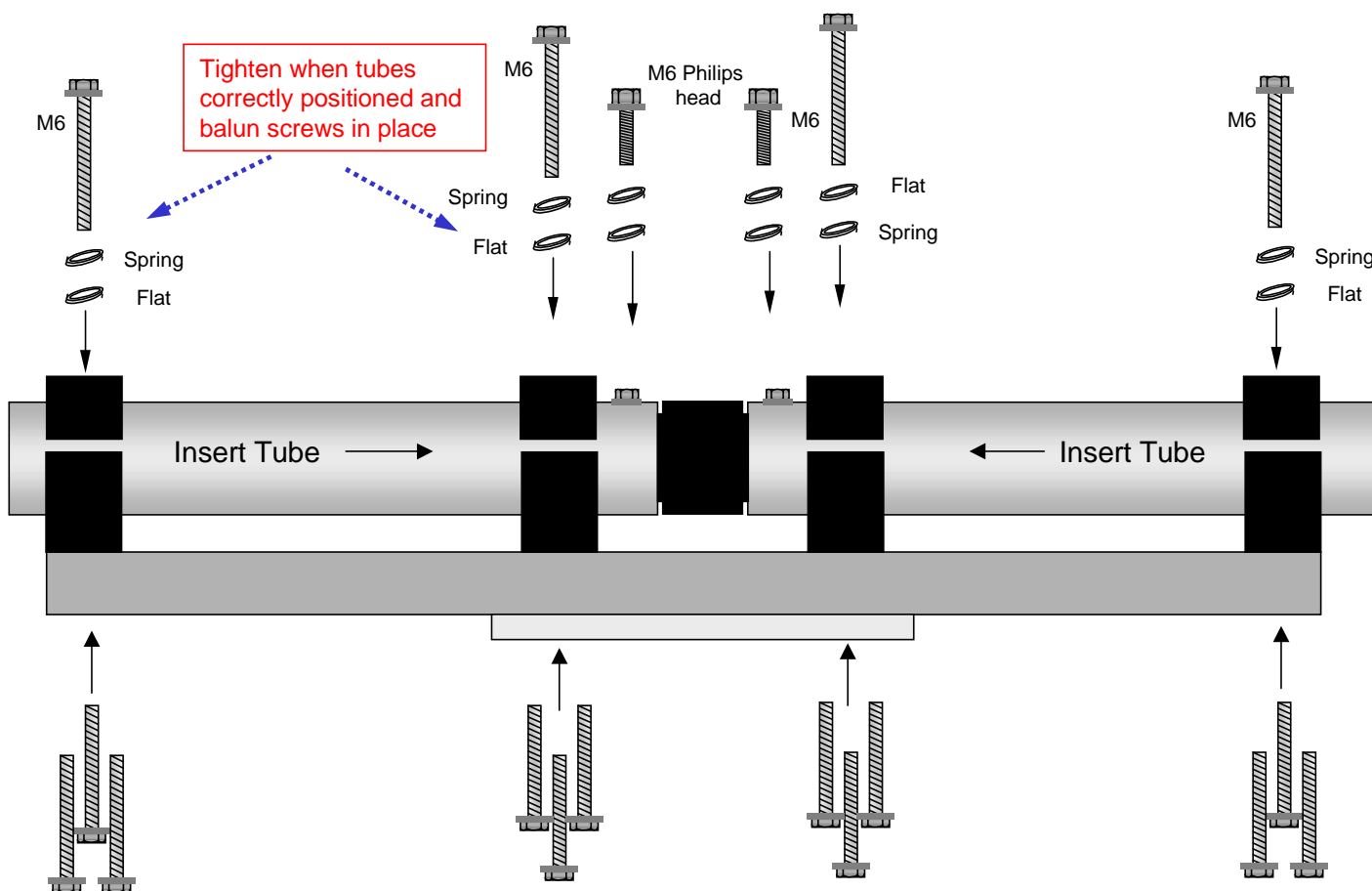


Figure 1 – Centre Mount Assmby Detail

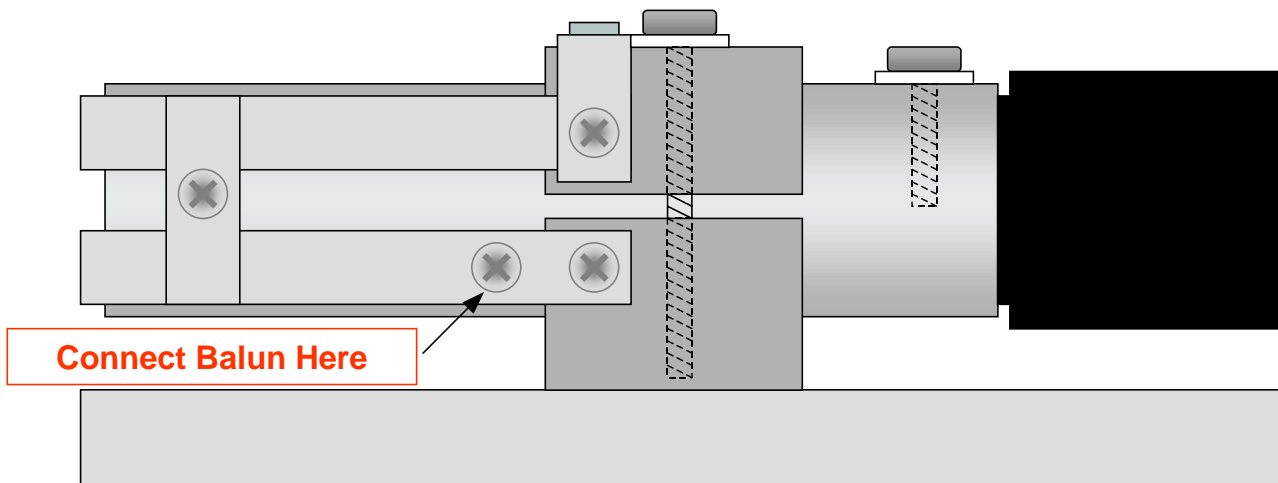


Figure 2 – Balun Connection Point

Locate the remaining two (2) shorting bars and slide them over the outer sections of the 32mm element section. If you have ordered and been supplied shorting relays, locate the two relay boxes and place them into the holes at the end of the shorting bars. Secure the relay boxes in place with

M5 flat washer, spring washer and nuts to the base of the relay boxes. Align the shorting bars so that they will point downwards when the antenna is in its final mounting position. Tighten the M6 screws that secure the shorting bars in place.

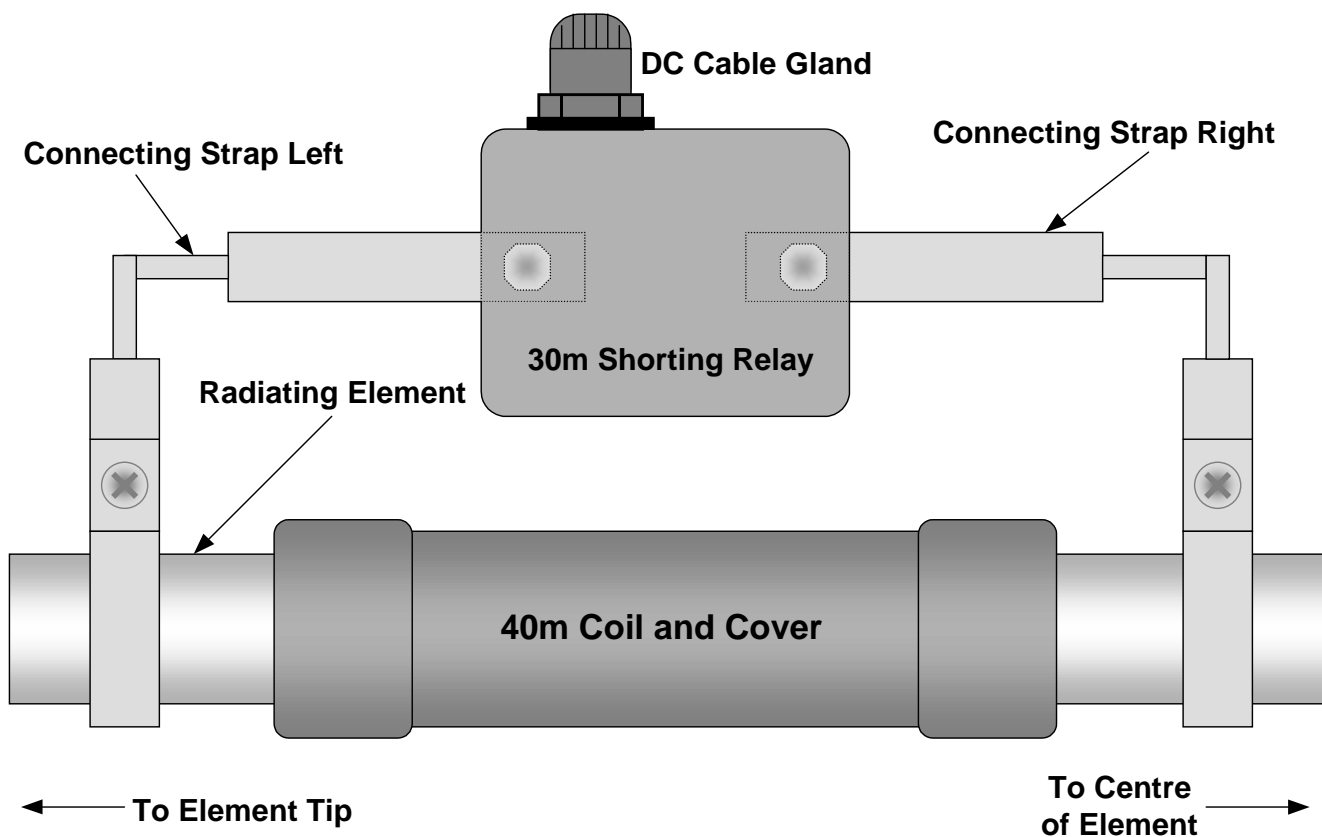


Figure 3 – Shorting Bar and Relay Box Assembly



Locate the 32mm hose clamp (this is the largest one supplied). Place the hose clamp over the end of the 32mm tube section and slightly tighten so that the clamp. Locate the next smaller radiating element section and secure in place. This tube should be inserted approximately 7.5 to 10cm into the larger section. Tighten the hose clamp. Repeat for both sides of the antenna.

Locate the 25mm hose clamp (this is the middle sized one supplied). Place the hose clamp over the tube section and slightly tighten so that the clamp only just does not move. Locate the next smaller

section and insert into the short end into the middle section. Repeat for both sides of the antenna.

Locate the 16mm hose clamp (this is the smallest one supplied). Place the hose clamp over the end of the tube section and tighten so that the clamp only just does not move.

Insert the final section. Carefully measure the length of each side of the antenna and adjust until the total length from the outermost insulating block to the tip of the antenna is 7.1m. Refer to Figure 4 – Dimensions for Tuning for guidance. Check that each hose clamp has been securely tightened.

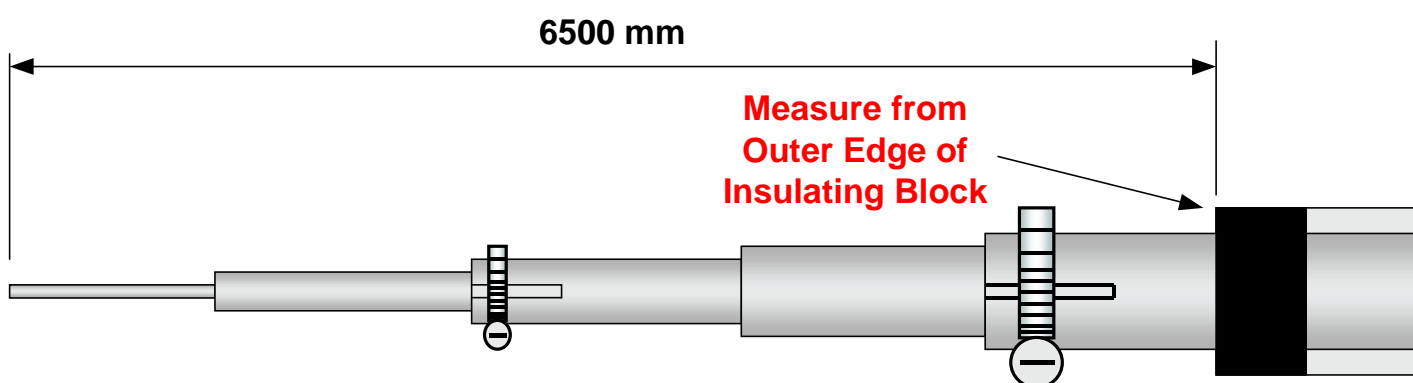


Figure 4 – Dimensions for Tuning

The DC shorting relay cables should now be attached to the antenna using the supplied cable ties. Secure the cable to the underside of the antenna. Provide a small drip loop near the relay boxes to assist with prevention of moisture ingress into the relay boxes. Refer to Figure 5 – Final Assembly and Connection Detail for guidance.

Connect the balun pigtailed to the connection points and the balun. When the antenna is mounted to the mast, use cables ties to attach the balun to the mast. Ensure that the weight of the balun and feeder is not supported by the balun pigtailed, i.e provide slack for the balun pigtailed. Adjust the tuning stubs to their midpoint and tighten.

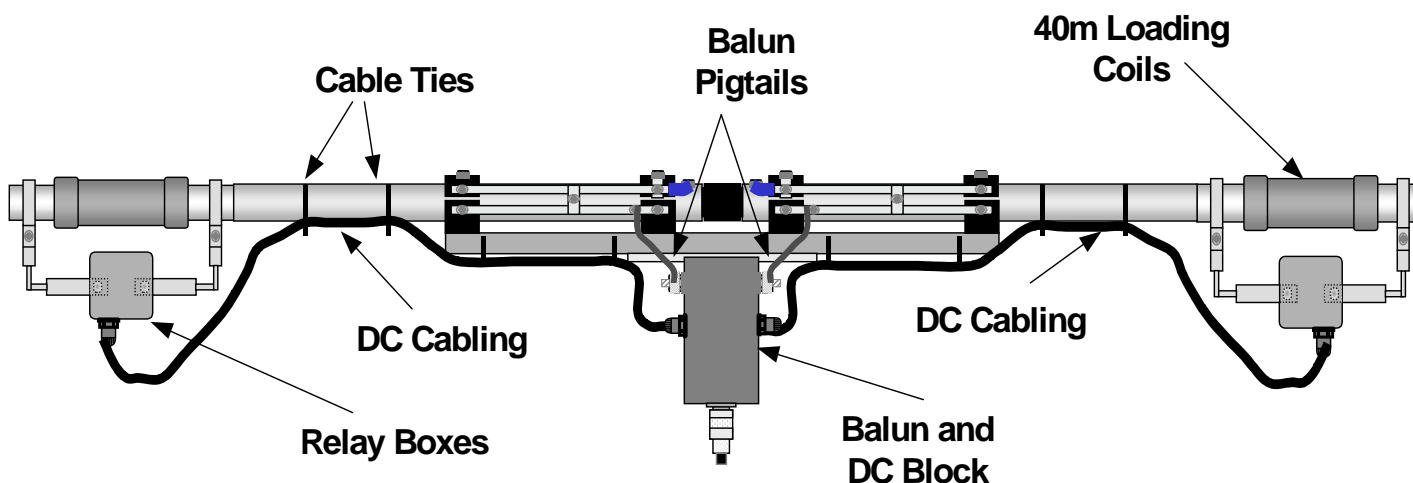


Figure 5 – Final Assembly and Connection Detail



Finally, check that there is an electrical connection between the small right angle bracket which connects the tuning stubs to the radiating element. This M5 x 12mm phillips head screw should retail the bracket in place as well as connecting to the 32mm section of radiating element. Use a multimeter to check that there is a DC connection.

Since the balun is DC short, there should be a DC short between the two element halves via the balun. With the balun disconnected there should be a DC open between the two element halves. Refer to Figure 7 – Resonance Adjustment and Balun Connection for guidance.

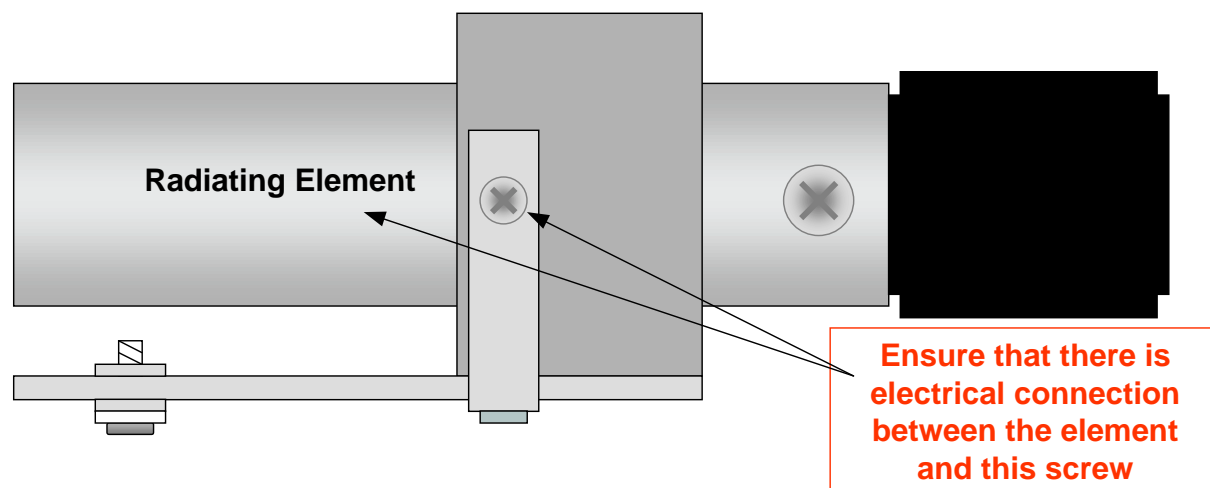


Figure 6 – Adjustment Tab Element Connection

Normally, a good match can be achieved by altering the radiating element length.

If difficulties are encountered use an antenna analyser to measure the input impedance of the antenna. This is best achieved using a 1/2 wavelength feeder cable or RG-58 or RG-8 (RG213). Refer to Table 1 - 1/2 and Full Wavelength Feeder Cable Lengths (Velocity Factor 0.66), which details the length of cable required for the intended use of your antenna. Using a 1/2 wavelength (or full wavelength) of cable ensures that the antenna analyser readout is correct for both magnitude and phase of the input impedance, i.e. the real and imaginary components are correct.

Perform a final check of the lengths of the elements shown in Figure 4 – Dimensions for Tuning. Note that the dimensions stated in this document are for an installation height of 10m or greater. If the antenna is mounted less than ten (10)m high then the dimensions shown will have to be reduced. This antenna is not designed to be installed at heights less than 10m.

Insert the two U bolts into the mounting bracket and temporarily adjust to suit the diameter of your supporting mast. A diameter of 50mm (2”) is recommended for this antenna.

Your TZ-RD-34 is now ready for installation on your tower

Frequency (MHz)	Cable Length (m)	Cable Length (ft & inches)	
7.100	13.85	45	5
7.100	27.7	90	11
10.125	9.71	31	10.5
10.125	19.43	63	9

Table 1 - 1/2 and Full Wavelength Feeder Cable Lengths (Velocity Factor 0.66)

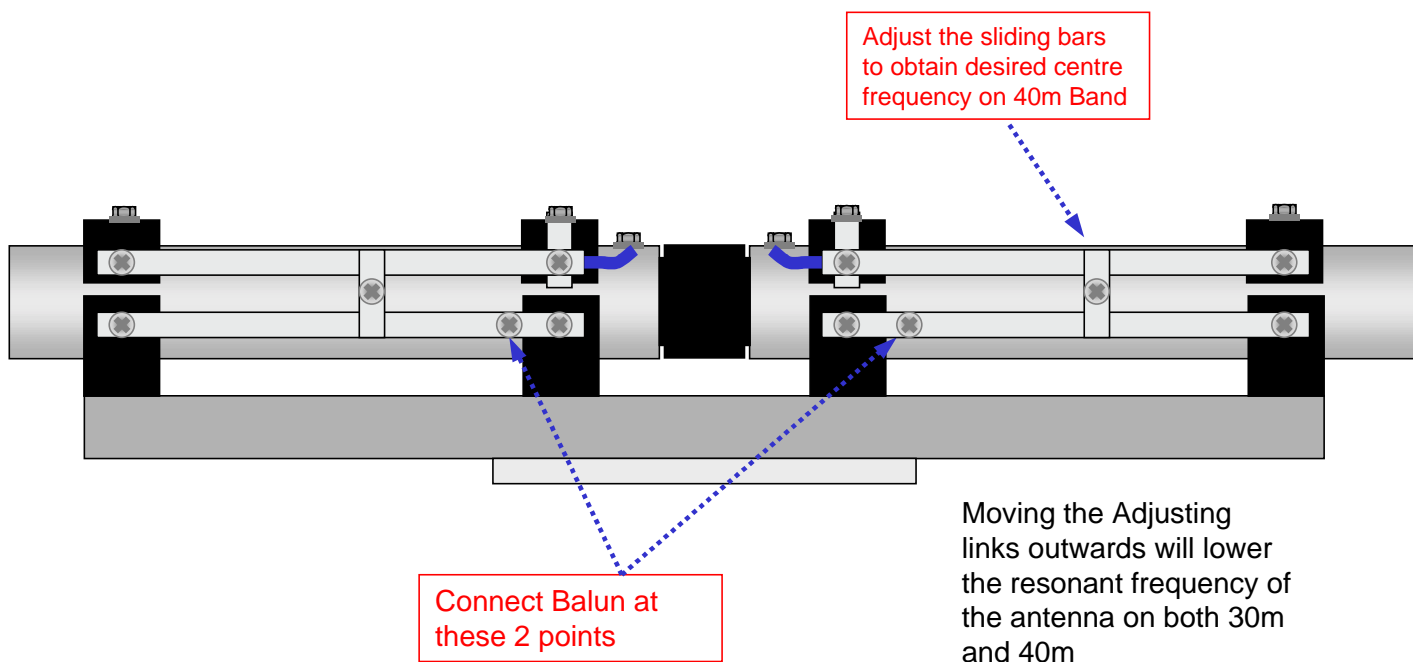


Figure 7 – Resonance Adjustment and Balun Connection

Mounting Your TZ-RD-34 with an existing beam

In most installations the TZ-RD-34 will be mounted on a tower with an existing tri-bander for the traditional HF bands. There are two installation methods that are recommended to ensure minimum interaction between the TZ-RD-34 and any existing or future antennas.

Method 1 – Vertical Separation

If you desire to have the TZ-RD-34 face in the same direction as your existing antennas, it is recommended that the TZ-RD-34 be mounted with at least 3m vertical clearance. Reasonable results can be achieved with only 2m vertical separation but there will be some interaction between the antennas. This will be noticeable as a change in the VSWR responses of either antenna, which in some instances can actually reduce VSWR readings. However, in such instances it is likely that the gain, bandwidth and/or F/B ratio of the beam antenna

will be degraded. Greater than 3m vertical separation will result in negligible interaction between the antennas.

Method 2 – Angular Separation

An alternative method to the vertical separation method is to mount the TZ-RD-34 at right angles to the main beam, that is with the TZ-RD-34 parallel to the boom of any existing beam antenna. When mounted parallel to the boom of a beam antenna the TZ-RD-34 may be mounted only 1m above the boom without adversely affecting the performance of the beam antenna. There will however, be a degradation in the VSWR curves of the TZ-RD-34 if the boom of the antenna is long, (approx 4m or longer). If the TZ-RD-34 is separated at 2m or greater the VSWR of the TZ-RD-34 should be unchanged from the figures specified within this document.

Tuning Your TZ-RD-34 Rotary Dipole

Since the WARC bands are relatively narrow the TZ-RD-34 should normally be tuned for operation on the particular 40m band segment of interest. It is unlikely that the 30m VSWR will be greater than 2.0:1 when the 40m resonance is within the region

7.0 – 7.25 MHz. Refer to the dimensions given in Figure 4 – Dimensions for Tuning.

The electrical length of this antenna varies with the height above ground. The higher the antenna, the longer the elements are required to be. At heights greater than 15m the effective length of the

element will remain relatively unchanged. The length given in Figure 4 – Dimensions for Tuning is suitable for mounting the antenna in the clear at least 15m above ground.

To tune the antenna for a VSWR dip at your preferred frequency, use the adjustment tabs on the centre mount. To lower the resonant frequency, move the shorting tabs further outwards. To raise the resonant frequency move the tabs inwards. The tabs should be symmetrical, i.e same distance out on each side.

Should your installation present an unacceptable VSWR or the VSWR dip is not within the bands. The following procedure should be followed.

Step 1

Mount the TZ-RD-34 on a tall step ladder in a clear space so that the antenna is clear of any nearby metallic objects. The antenna should be at around 3m above the ground. Use an antenna analyser or VSWR meter to measure the resonant frequency at each band.

Step 2

Specifications

Type	Loaded 40m/30m Rotary Dipole.	
Frequency Range	Adjustable 7.00 – 7.300 and 10.100 – 10.150 MHz .	
Bandwidth	30m: 400 kHz	40m: 250 kHz, (2.0 : 1 VSWR limit).
Input Impedance	Nominally 50 ohm.	
Radiation polarisation	Horizontal mounting	
Gain	30m – 0 dBd,	40m –0.5 dBd
Directivity	Up to 2.14 dBi.	
Power Handling	1000 Watts PEP	
Total Weight	8.0 kg.	
Electrical Length	30m – 95%,	40m – 72%
Overall Length	14.2 m	
Element Sizes	32mm – 10mm Dia	
Wind Survival	150 km/h	

Adjust the shorting tab on the tuning bars to the mid point.

Step 3

Adjust the length of the element to obtain a VSWR dip approximately 150 kHz below the required frequency. *Do not adjust the antenna to resonate at the frequency required when the antenna is only 3m above ground. This will result in a VSWR dip out of band when the antenna is mounted at full height.*

Step 4

If resonance cannot be achieved, adjust the shorting tab. Position the tab close to the centre of the element to raise the resonant frequency or further outwards to lower the resonant frequency.

If unacceptable VSWR persists, ensure that the antenna is mounted well in the clear. Locate the antenna as far as possible from other antennas or metallic objects. Raise or lower the antenna to alter the input impedance of the antenna.

Note the dimensions for future reference of your particular installation preferences.