



TZ-RD-3w WARC Band Rotary Dipole Installation Manual

The TZ-RD-3w is a trapped dipole antenna for the 12, 17 and 30m amateur bands. The antenna uses an aluminium radiating section and four traps to permit performance on three 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 coaxial traps which are sealed against the ingress of moisture and surrounded with a PVC cover to protect the traps from rodent and bird attack, a common occurrence in many locations. 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 the whole of the 12m, 17m and 30m bands.

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 of the TZ-RD-3w or your other antenna(s) may be adversely affected.. When mounted on a pole 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-V-3w antenna:

Radiating element:	Radiating section – Various sleeved aluminium sections.
Traps	(4) Two traps – 12m and 17m resonant.
Adjustment hose clamps	(6) Three stainless steel hose clamps, 32mm, 25mm and 15mm.
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. The use of a balun with this antenna is highly 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.

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-3w antenna:

- a. Flat blade screwdriver,
- b. M6 and M5 allen keys
- c. 13mm open ended spanner,
- d. No 2 phillips head screwdriver,
- e. VSWR Meter or antenna analyser.

Warning Electrocutation 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 brackets using the supplied M6 by 40mm hex head dome screws. Use a 3mm allen key. Each insulating block requires two (2) screws. Use a flat washer under each screw.

Once the two (2) outer insulating blocks have been secured to the bracket, mount the centre insulator with integral insulating tube. Insert both of the 32mm tube sections into place. The sections should slide into the insulating block holes and over the insulating centre tube. Use the two (2) M6 phillips head screws to secure the centre elements in place and also to secure the balun pigtails in position.

Locate the centre sections of the inner element and insert them into the large 32mm sections, securing them in place with the supplied Stainless steel self

tapping screws. Alternatively, aluminium pop rivets can be used for a more permanent installation, refer to Figure 1 – Centre Mount Assembly 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-3w 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.

Locate the 32mm hose clamp (this is the largest one supplied). Place the hose clamp over the end of the 28mm tube section and tighten so that the



clamp only just does not move when the section is held vertical. Locate the 12m trap sections, and insert into the ends on the 28mm tube sections. 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 end of the 12m trap tube section and tighten so that the clamp only just does not move when the section is held vertical. Locate the 17m trap sections, and insert into the short end into the 12m trap tube 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 17m trap tube section and tighten so that the clamp only just does not move when the section is held vertical. Locate the 30m extension tube section, and insert into the ends on the 17m tube sections. Repeat for both sides of the antenna.

Finally, locate the 10mm sections with plastic caps. Insert these into the elements and secure in place using the supplied stainless steel self tapping screws, or alternatively pop rivet in place. Your antenna is now ready to be trimmed to length. Note that some minor adjustment of the element lengths may be required, as compared to the lengths stated in this manual due to the varied circumstances and heights of your particular antenna installation.

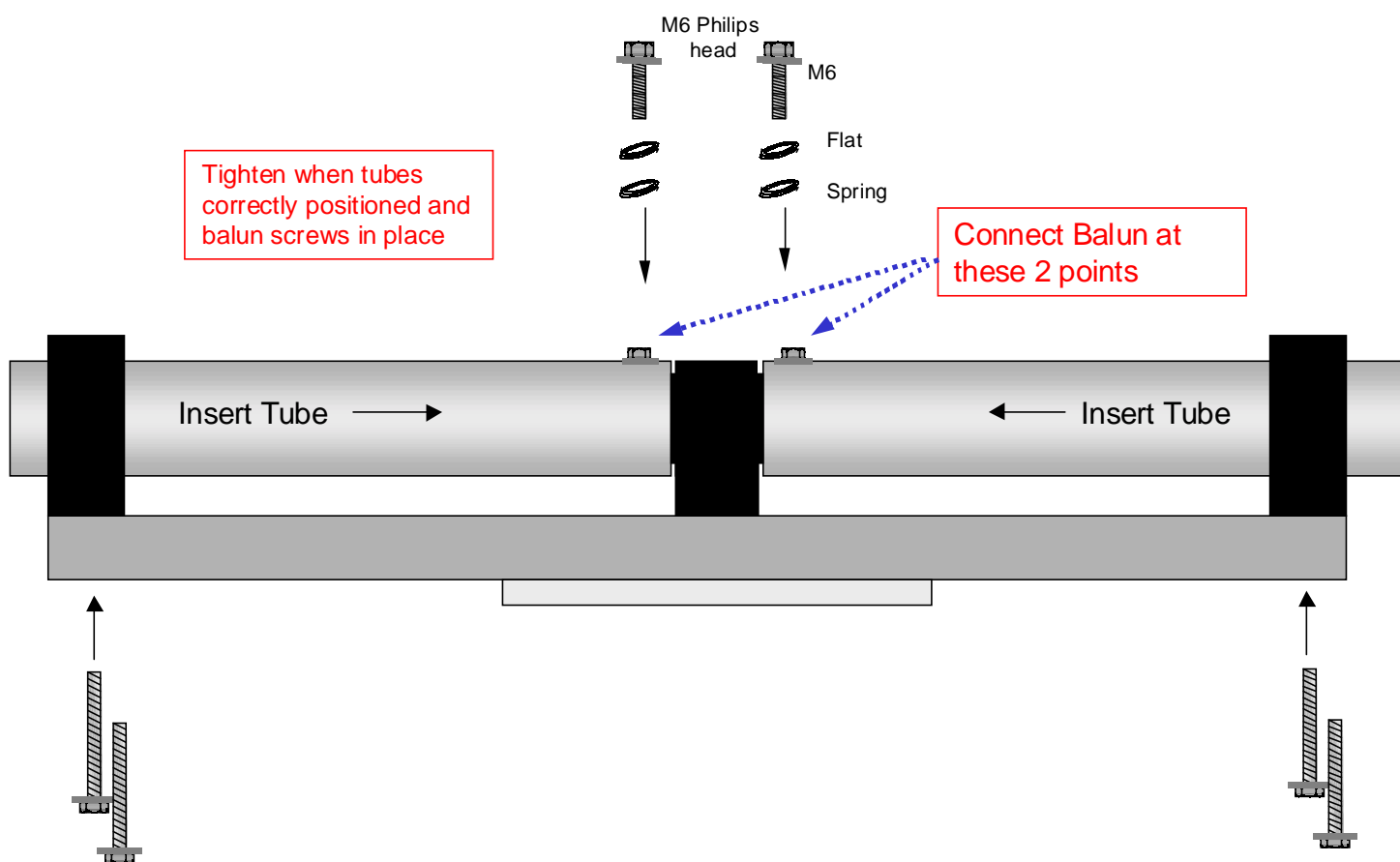


Figure 1 – Centre Mount Assembly Detail

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 ½ wavelength feeder cable or RG-58 or RG-8 (RG213). Refer to Table 1 - 1/2 Wavelength Feeder Cable Lengths

(Velocity Factor 0.66), which details the length of cable required for the intended use of your antenna. Using a ½ 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.



Frequency (MHz)	Cable Length (m)	Cable Length (ft & inches)	
10.125	19.43	63	9
10.125	9.71	31	10.5
18.130	10.85	35	7
18.130	5.42	17	9.5
24.950	7.88	25	10.5
24.950	3.94	12	11

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

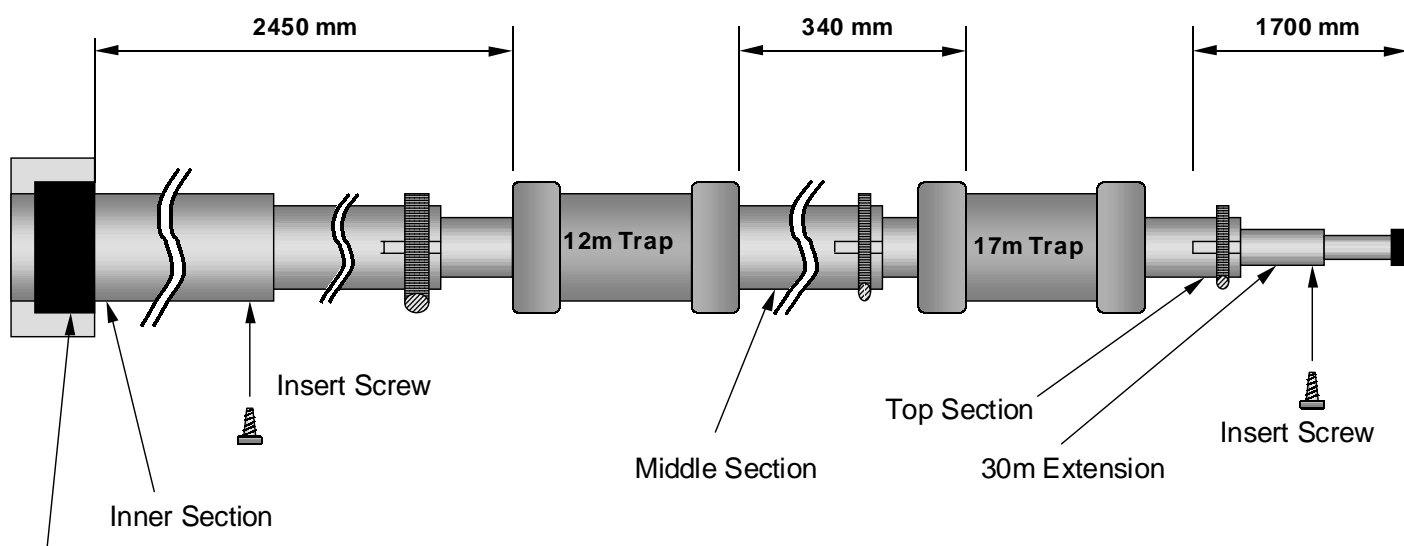


Figure 2 – Dimensions for Tuning

Use a tape measure to adjust the lengths of the telescoping tubing to the distances shown in Figure 2 – Dimensions for Tuning. Tighten the hose clamps for all three sections. Re-check the dimensions. 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 7.5m.

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

Your TZ-RD-3w is now ready for installation on your tower.

NOTES

Your antenna may be supplied with insulation tape marking the correct length for each section (generally an additional fee applies). If this is the case, simply slide the smaller tubing inside the larger tubing until the tape just abuts the larger diameter tube. The tape should not be inserted into the tube. Tighten the hose clamps to secure the sections in position. The marker tape may then be removed.

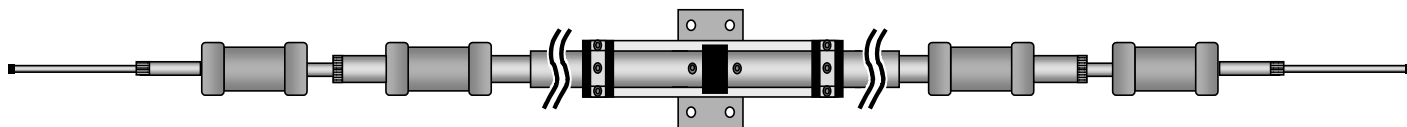


Figure 3 – Final Assembly Layout

Mounting Your TZ-RD-3W with an existing beam

In most installations the TZ-RD-3w 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-3w and any existing or future antennas.

Method 1 – Vertical Separation

If you desire to have the TZ-RD-3W face in the same direction as your existing antennas, it is recommended that the TZ-RD-3W 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-3w at right angles to the main beam, that is with the TZ-RD-3w parallel to the boom of any existing beam antenna. When mounted parallel to the boom of a beam antenna the TZ-RD-3w 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-3w if the boom of the antenna is long, (approx 4m or longer). If the TZ-RD-3W is separated at 2m or greater the VSWR of the TZ-RD-3w should be unchanged from the figures specified within this document.

Tuning Your TZ-RD-3w Rotary Dipole

Since the WARC bands are relatively narrow the TZ-RD-3w should not normally require adjustment from the dimensions given in Figure 2 – Dimensions for Tuning. Should your installation present an unacceptable VSWR and the lowest VSWR dip point is not within the WARC bands. The following procedure should be followed.

Step 1

Mount the TZ-RD-3w 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

Adjust the length of the 12m section first 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 3

Adjust the length of the 17m section first to obtain a VSWR dip approximately 200 kHz below the required frequency.

Step 4

Adjust the length of the 17m section first to obtain a VSWR dip approximately 200 kHz below the required frequency.

Note: Ensure that the 12m section is adjusted first, followed by the 17m and the 30m section last.

Erect a temporary stub mast or ladder to mount the antenna at approximately 8m and check the VSWR



on each of the above bands. The VSWR dip point should have shifted to approximately the centre of each band. If required fine tuning of the resonant point may be made by adjusting the lengths in or out by 1 – 3 cm without affecting other bands.

Note the dimensions A, B, and C for future reference of your particular installation preferences.

Specifications

Type	Trapped Rotary Dipole.
Frequency Range	Adjustable 24.890 – 24.990, 18.068 – 18.168, 10.100 – 10.150 MHz .
Bandwidth	12m 2000 kHz, 17m 500 kHz, 30m, 500 kHz (2.0 : 1 VSWR limit).
Input Impedance	Nominally 50 ohm.
Radiation polarisation	Horizontal mounting
Gain	12m – 0 dBd, 17m –0.25 dBd, 30m –0.75 dBd
Directivity	Up to 2.14 dBi.
Front to Back	Not Applicable.
Power Handling	1000 Watts PEP
Total Weight	7.5 kg.
Overall Length	9.040 m
Wind Survival	150 km/h