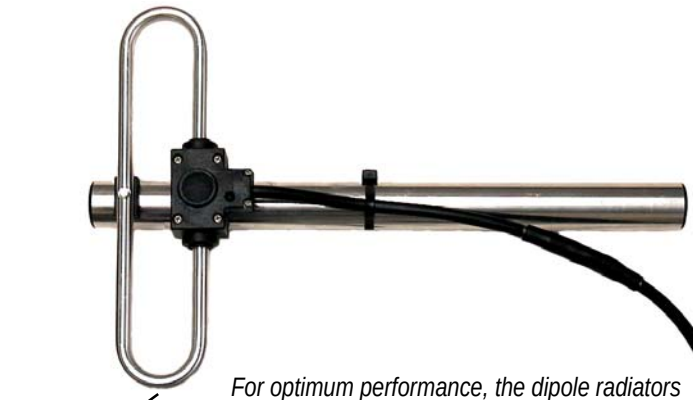
FUHFDP Installation Guide

The FUHFDP is a well designed and constructed half wave folded dipole aerial with BALUN matching for use with all SCOPE UHF paging systems. It is capable of providing excellent coverage of very large sites provided it is sited and installed correctly.



For optimum performance, the dipole radiators must be positioned vertically with the drain hole facing downwards towards the ground.

Scope transmitters operate on UHF frequencies which incur high power losses in the antenna feeder cable. Always use quality 50 OHM coaxial cable. RG58 is only acceptable on cable runs of up to 5 metres. We recommend RG213 or better on greater lengths up to about 15 metres. Longer runs should be avoided if possible. Use only high quality solder-fit connectors. Pre-terminated feeder cable in 5, 10 and 15 metre lengths are available from SCOPE.

- ☐ Ensure that the connection from the aerial to the feeder cable is sealed correctly (see reverse for details) and that the feeder cable is adequately clamped along the entire run. **DO NOT COIL EXCESS CABLE.**

- ☐ The aerial can be supplied with either a wall mounting bracket or pole mounting clamp. **If using the wall bracket, ensure that the aerial is mounted on a vertical wall facing the primary coverage area and away from any metal objects.**

- ☐ If a more omni-directional coverage is required, either mount the aerial at the top of a building with the upper radiator above roof level, or mount on a vertical pole above roof height using the pole mount clamp.

- ☐ For propagation throughout a large multi-storey building, the best coverage is often achieved by either mounting the aerial in a riser, or mounting it outside the building at half the building height.

- ☐ Where penetration of buildings is required as opposed to maximum range, increasing the aerial height could be counter productive. In these circumstances, lowering the aerial may be the best solution, assisting signal penetration through windows and doors etc.

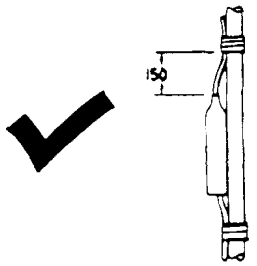
- ☐ UHF signals do not travel well over hills but they will bounce off obstructions and in many cases the signal will be received by reflection rather than by direct path.

- ☐ Watch out for hazards to transmission: Foil backed plasterboard, metal clad buildings, chain link and chicken wire fencing all act as screens to radio waves, severely limiting the range.

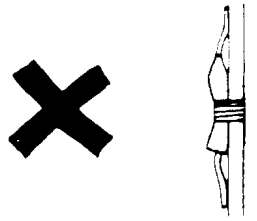
WRAPPING OF JOINT TO MAIN FEEDER

Required: Scotch 3M Tape No. 23 (Self bonding)
Scotch 3M Tape No. 88 (Vinyl Plastic Tape)
Shroud 9618116

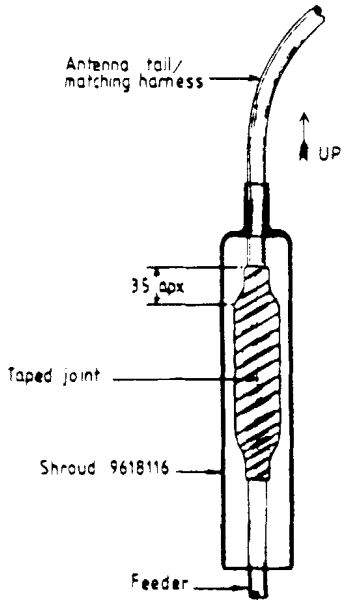
Procedure:



Slide the shroud away from the connector approximately 250mm (10"). Using the self bonding tape, commence wrapping approximately 35mm (1.5") from the connector. The tape should be stretched 2 - 3 times its natural length to ensure a tight fit — free of voids. The first turn should provide 100% overlap, gradually reducing overlap to not less than 50%. Ensure no voids are produced in the wrapping, by building up tape at the connector to avoid a steep step. Continue wrapping to finish on the coaxial feeder about 35mm (1.5") on the far side of the connector.



An over-wrapping with PVC tape should be applied, to completely cover the previous wrap, starting slightly before the filler tape, and finishing after it. Again 100% overlap, followed by 50% overlap, is recommended, the tape being kept taut during wrapping.



The shroud should then be slid down to shelter the joint, the cable being fastened to the mast above and below the shroud thus securing it in a vertical position. Avoid excessive slack which could strain the joint in high winds.

The inside of the shroud should be clear of the joint, and its lower end left open.

On stacked or bayed arrays, the cables must be arranged to have the open end of the shroud pointing downwards. Where the shroud is not used, it should be removed from the antenna tail.

Mounting

The effect of the supporting mast on the horizontal polar diagram and impedance of a vertically polarised side-mounted antenna depends upon the spacing between the mast and the antenna and on the diameter of the mast. The horizontal polar plots for a number of antenna-to-mast spacings are shown in Figures 1 to 5. The dotted curve shows the pattern of a reference end-fed dipole antenna, masthead mounted.

Even at two wavelengths spacing from a 51mm (2 in.) od mast there is distortion of the horizontal polar diagram and this distortion alters as the diameter of the mast or tower increases. However, as there is also distortion of the horizontal pattern due to the local topography, the irregularity due to the mast size is not usually significant.

The departure from circularity with a 51mm (2 in.) od mast is always in the region ±3db irrespective of the mast-to-dipole spacing. With a mast-to-dipole spacing of a quarter-wavelength or less the horizontal pattern is approximately circular with the centre offset from the mast giving a front/back ratio of 6db. As the spacing is increased to a half-wavelength the pattern becomes broadly bi-directional, three-quarters-wavelength tri-directional, and so on with an extra lobe for each quarter-wavelength (see Figures 2-5). For half-wavelength spacing the pattern irregularity can be about ±3db, i.e. 3db gain sideways, 3db loss behind the mast.

If a larger diameter mast is used, such as a BICC mast with 305mm (12 in.) sides, the effect on the polar diagram is to make the lobes thinner and the troughs deeper. In the case of a high band antenna at quarter-wavelength spacing the front/back ratio becomes about 9.5 db, and in the case of the low band antenna about 7.5db. At half-wavelength from a BICC mast the high band irregularity is about ±5db and the low band ±3db. These modest directional effects can sometimes be used in scheme planning.

Spacings of less than three-sixteenths of a wavelength from a 51mm (2 in.) od mast give rise to degradation of the VSWR characteristic, but at spacings of three-sixteenths of a wavelength and greater the alteration of the antenna feed impedance is such that the VSWR remains satisfactory. The typical VSWRs for particular antenna-to-mast spacings are shown in Figures 1-5 below. Taking account of all these factors, quarter-wave spacing is recommended for general purposes. This provides near omni-directional coverage with optimum VSWR response.

ANTENNA	QUARTER-WAVE SPACING Metres	(Ins.)
FUHFDP	0.17	(6.7)

TYPICAL VSWR, 1.35 : 1

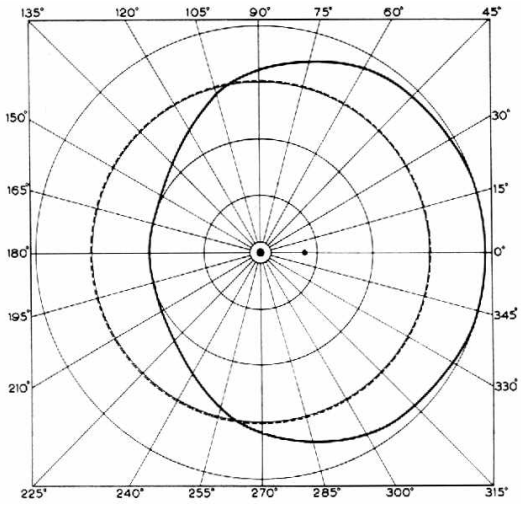


Fig 1: H-Plane Polar Diagram antenna mounted 3λ/16 from 51mm OD mast

TYPICAL VSWR, 1.15 : 1

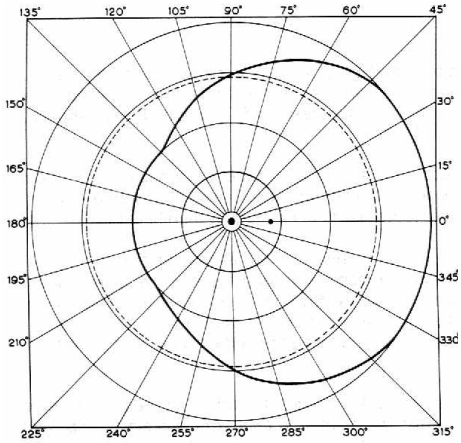


Fig 2: H-Plane Polar Diagram, antenna mounted l / 4 from 51mm OD mast.

TYPICAL VSWR, 1.5 : 1

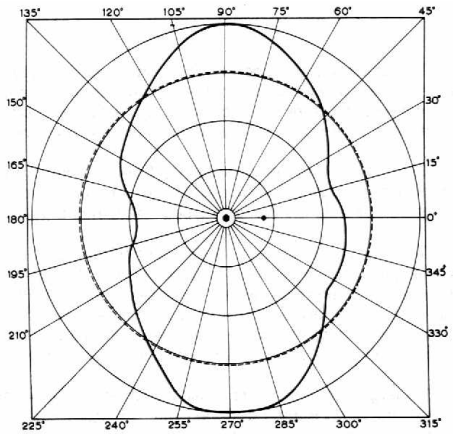


Fig 3: H-Plane Polar Diagram, antenna mounted l / 2 from 51mm OD mast.

TYPICAL VSWR, 1.2 : 1

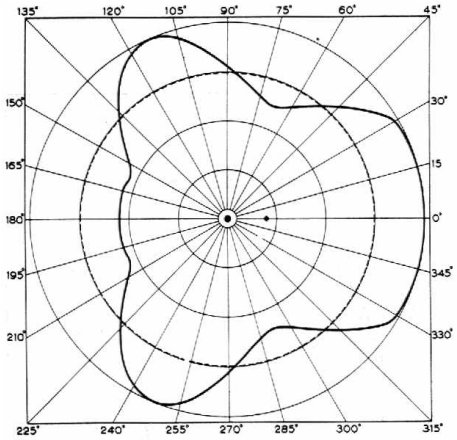


Fig 4: H-Plane Polar Diagram, antenna mounted 3l / 4 from 51mm OD mast.

TYPICAL VSWR, 1.4 : 1

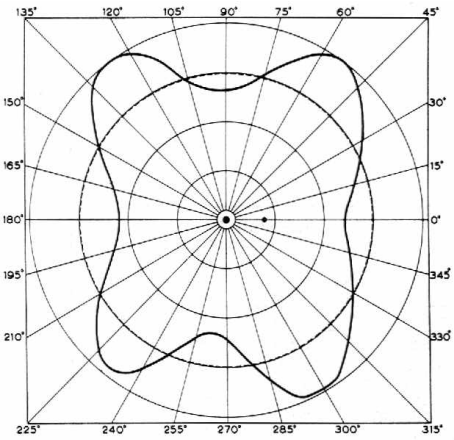


Fig 5: H-Plane Polar Diagram, antenna mountedl from 51mm OD mast.