ADB-FM3 VHF/FM VPOL Antenna

AlanDick

Half-wave Dipole, Horizontal/Vertical Polarisation

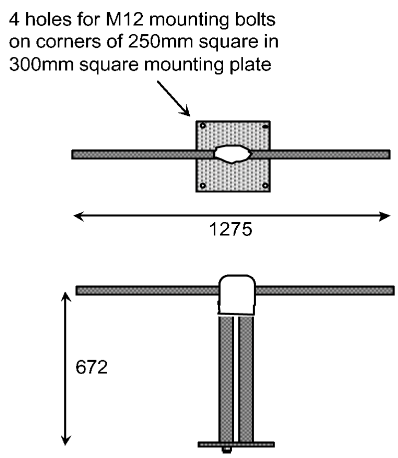
Application

Despite being one of the simplest radiating elements available, the Half-wave Dipole is also one of the most versatile for vertical, horizontal or slant polarisation. It may be used with or without a reflecting screen. This data sheet indicates some of the many ways in which the AlanDick dipole can simplify problems and improve service.

Design

The AlanDick Broadcast Half-wave Dipole is a rugged design built to give many years of trouble free service. Poor mechanical design is responsible for many of the most common failures in VHF antennas, whether from vibration or corrosion. In the AlanDick unit both the dipole arms and their balun assembly are fabricated from heavy gauge mild steel tubing, galvanized to BS729. The inner conductor of the input matching transformer, housed in one leg of the balun, and the reactance compensation stub housed in one of the dipole arms, are both machined from solid brass rod.

The dipole has a gas seal at its input and is a ventilated, unpressurised design. The feed point is protected from the adverse affects of wet snow and ice by a GRP cover. Radiation Patterns of Single Dipoles.
These patterns apply to dipoles mounted on 0.6λ square screening frames.



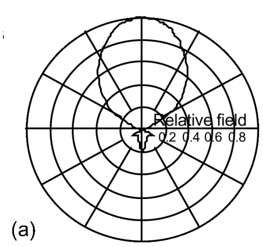
Approximate weight and Aerodynamic area		
Weight	16kg	35lbs
Area (BS CP3)		
Front	0.18m2	1.94ft2
Side (Horizontal Polarisation)	0.07m2	0.75ft2
Side (Vertical Polarisation)	0.11m2	1.18ft2

*Basic Dipole, excluding any screen frame

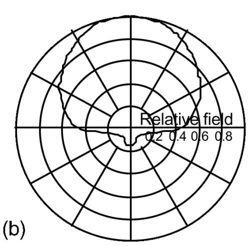
Product Specification	
Mean Power Rating (According to input connector)	
7.16 DIN 3kW	7/8 (EIA) 5kW
Impedance 50 ohms (Optimised in two sub-bands)	
88-95MHz and 95-108MHz	
VSWR	<1.15:1
Reflection coefficient	<7%
Return loss	>23dB

Horizontal Radiation Patterns

(a) Horizontally Polarised Dipole
(b) Vertically Polarised Dipole



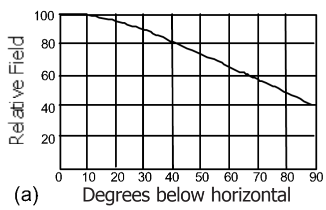
(a)



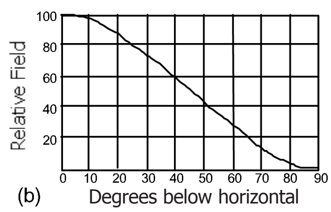
(b)

Vertical Radiation Patterns

(a) Horizontally Polarised Dipole
(b) Vertically Polarised Dipole



(a)



(b)

In pursuance of continual product improvement, AlanDick reserve the right to change specifications without prior notice

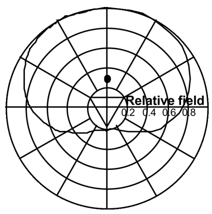
Edition No: 1-03

ADB-FM3 VHF/FM VPOL Antenna

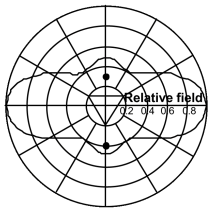
Half-wave Dipole, Horizontal/Vertical Polarisation

Horizontal Radiation Patterns

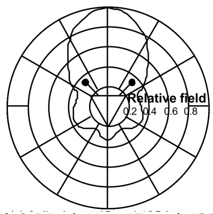
Typical Horizontal Radiation Patterns for vertically polarised dipoles on a 900mm face tower.



(a) Single Dipole
Max/Mean gain 1.9; 2.7dB



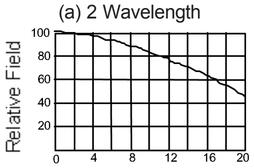
(b) 2 Dipoles at 0 and 180deg.
Max/Mean gain 2.4; 3.9dB



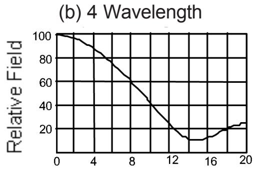
(c) 2 Dipoles at 45 and 135deg.
Max/Mean gain 3.8; 5.8dB

Vertical Radiation Patterns

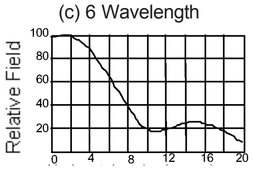
(a) 2 Wavelength



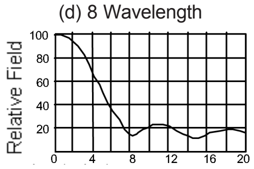
(b) 4 Wavelength



(c) 6 Wavelength



(d) 8 Wavelength



Horizontal scale shows degrees below the horizon

Array Patterns

The half-wave dipole forms the basis of many array designs. For horizontal polarisation the dipole is almost always mounted on a screening frame, so that arrays are built up from primary HRP's similar to that shown in (a) on the reverse side of this specification sheet. Both omni-directional and directional patterns are readily produced and AlanDick will be pleased to give further advice and assistance.

A strong feature of the dipole is the versatility with which it may be used for **vertical polarisation** either with or without additional screening frames. Mounted singly on a screening frame the dipole provides a primary HRP similar to that shown in (b) on the reverse side of this specification sheet, whilst mounted in pairs a pattern similar to that of the horizontally polarised dipole shown in (a) may be achieved. A very useful range of patterns may be achieved in a most economic manner by mounting vertical dipoles directly onto supporting poles or small cross section lattice structures. The pattern of a single dipole (and combinations of dipoles also) will vary considerably depending on the structure cross section. Three very useful and typical, patterns are shown in (a), (b) and (c) opposite. It should be also noted that the impedance of 'unscreened' dipoles will be affected by the mounting structure as well as of course by mutual coupling.

Vertical Radiation Patterns for Different Apertures

Horizontal dipoles may be stacked at either wavelength or half wavelength spacings depending on the detail of the required VRP with regard to gain and null fill. Vertical dipoles are restricted to wavelength spacings on account of their physical dimensions.

The patterns shown opposite have been computed for wavelength spacings. They show typical values for null fill which may readily be varied.

Mean gains for omnidirectional arrays at 97MHz and with 1.0λ tier spacing

(Incuding allowances for typical null fill and distribution feeder losses)

No. of tiers	2	3	4	6	8	10
Mean gain, dB	2.8	4.6	5.9	7.6	8.8	9.9

In pursuance of continual product improvement, AlanDick Broadcast reserve the right to change specifications without prior notice.