Radiation-hardened Magnetic field (B-Dot) sensors

Radiation-hardened B-Dot sensors are available in both free-field and ground-plane configurations. The RB40 and RB130 are small, mid-range, free field frequency sensors. The RB100 is a ground plane sensor. These sensors were designed to measure B-Dot fields in a nuclear radiation environment:

- High transparency
- Continuous aluminium cylindrical loop
- Dual moebius pickoff
- Totally encapsulated

The loop is attached to a copper tube, normally 12 inches long, which allows mounting. Semi-rigid type 50Ω output cables exit from the tube. The standard length of the tube end is 45.7cm. However, the tube and cable lengths can be varied on request.

SPECIFICATION

	RB100	RB40	RB130
Type	Ground plane	Free field	Free field
Equivalent Area (Aeq)	2 x $10^{-5}m^2$	1 x $10^{-3}m^2$	4 x $10^{-5}m^2$
Freq. Resp.(3 db pt.)	>3GHz	>300MHz	>2GHz
Risetime (tr 10-90)	<0.12ns	<1.1ns	<0.5ns
Maximum output (pulse)	1kV	1.5kV	1kV

EQUATION

The equation relating to surface current density is:

$$V_0 = A_{eq}\mu_0 \frac{dJ_s}{dt} \sin\theta$$

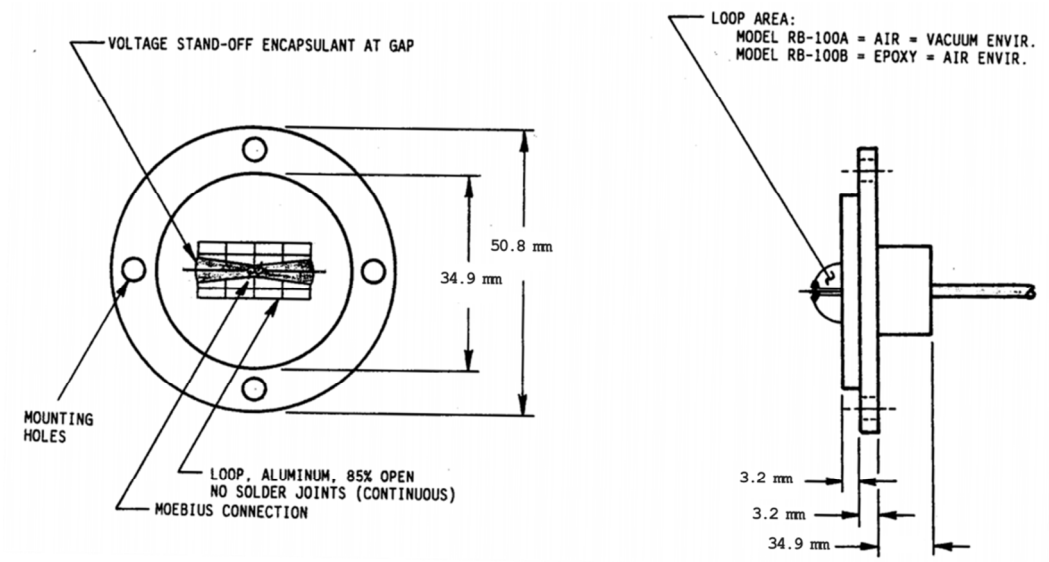
Where V_o = sensor output (volts), A_{eq} = sensor equivalent area (m^2), μ_0 = permeability of free space ($4\pi \times 10^{-7}$ H/m), J_s = surface current density (A/m), sin θ = angle between axis and J_s vector

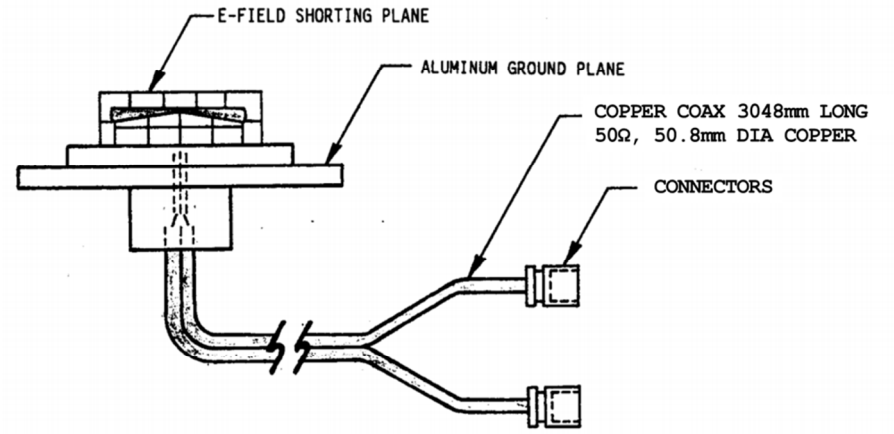
The equation relating to B-Dot measurements is:

$$V_0 = A_{eq} \frac{dB}{dt}$$

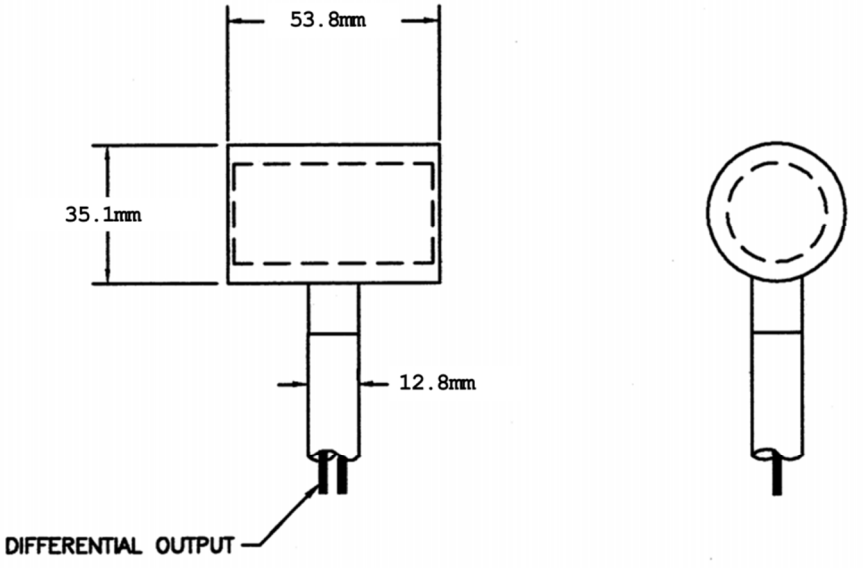
Where V_o = sensor output (volts), A_{eq} = sensor equivalent area (m^2), B = magnetic flux density (teslas)

RB100 DIMENSIONS





RB40 DIMENSIONS



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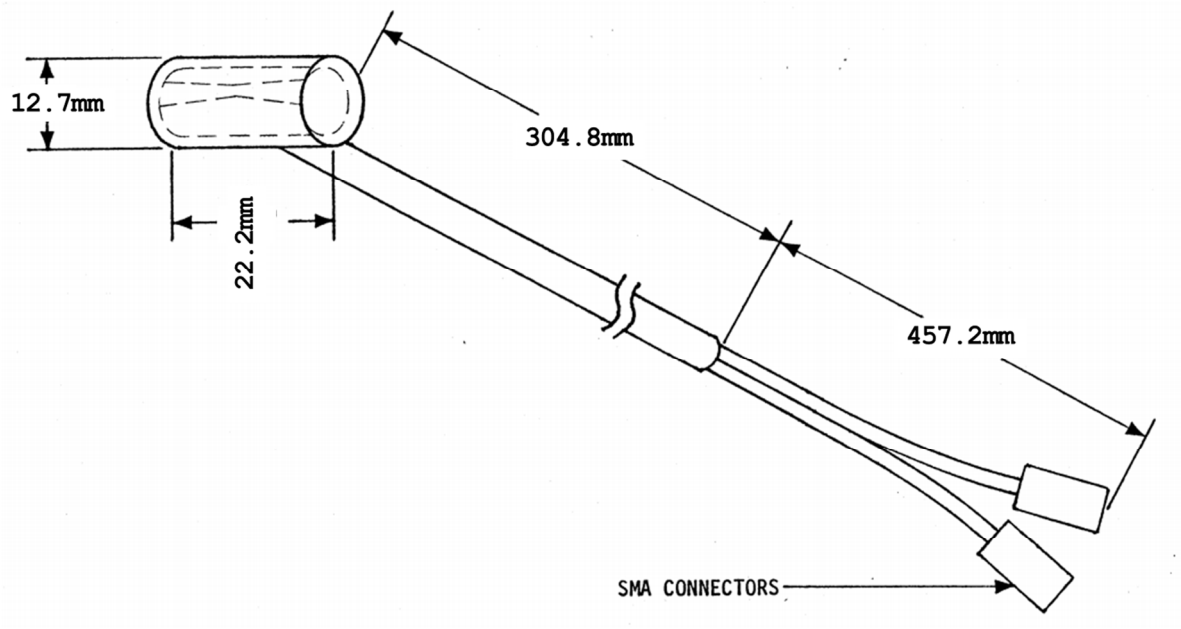
RB130



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