

MAGNETIC FIELD ( $\dot{B}$ ) & SURFACE CURRENT ( $\dot{J}$ ) SENSOR

MODEL B-S50

DESCRIPTION

The PRODYN Model B-S50 sensor is a B-dot loop equivalent to the AFWL Model MGL-S5. This sensor can be used as a B-dot sensor or it can be used to measure the time rate-of-change of surface current density since the magnetic field over a conductive sheet is related to surface current density. The sensor consists of a half-cylinder loop on a base plate, that when mounted to a conducting surface produces a voltage output in response to a time variant B field. The B-S50 is basically identical to the Model B-50. The differences are a smaller sensor base plate to facilitate mounting and connector placement on the B-S50 vs B-50.

This sensor has a parallel-series wiring configuration that cancels the electric field induced signals and makes the sensors' output signal the result of only the magnetic field. The equation pertinent to this device when used as a B-dot sensor is provided on the Model B-50 Data Sheet. The equation relating to surface current density measurements is:

$$V_o = A_{eq} \mu_o \frac{dJ_s}{dt} \sin \theta = \text{sensor output (in volts)}$$

where

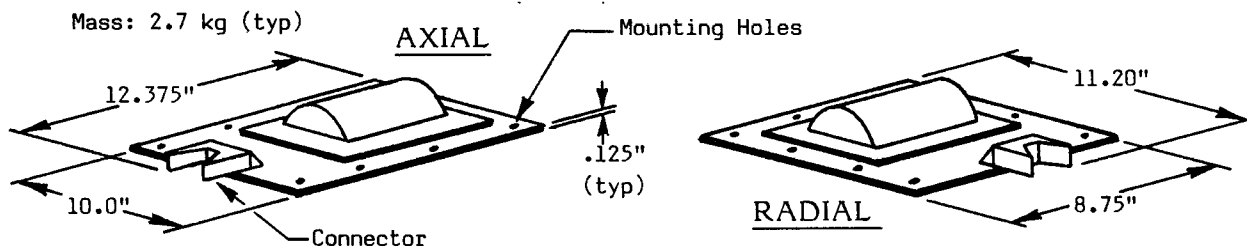
- $A_{eq}$  = sensor equivalent area (m<sup>2</sup>)
- $\mu_o$  = permeability of free space ( $4\pi \times 10^{-7}$  H/m)
- $J_s$  = surface current density (Amps/m)
- $\sin \theta$  = angle between sensor axis and  $J_s$  vector

The sensor is a passive device, therefore, an external power source is not required. The sensor is equipped for purging with a gas such as dry air, nitrogen, or SF<sub>6</sub>. The sensor is available with an axial output, Model B-S50(A), or a radial output, Model B-S50(R).

ELECTRICAL SPECIFICATIONS

Equivalent Area ( $A_{eq}$ ) .....	$1 \times 10^{-3}$ m <sup>2</sup>
Frequency Response (3 dB Point) .....	> 700 MHz
Risetime ( $t_r$ 10-90) .....	< 0.5 ns
Maximum Output (peak) .....	$\pm 5$ kV
Output Connector .....	50 ohm GR-874**

PHYSICAL SPECIFICATIONS



ORDERING INFORMATION

- \* Customer to specify axial (A) or radial (R) version.
- \*\* This can be changed to a Type N, SMA, etc. (Max output voltage will be affected)