

MAGNETIC FIELD (Ḃ) & SURFACE CURRENT (J) SENSOR

MODEL B-S40

Description

The PRODYN Model B-S40 sensor is a B-dot loop equivalent to the AWFL Model MGL-S4. 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. 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-S40 is basically identical to the Model B-40. The differences are a smaller sensor base plate to facilitate mounting and connector placement on the B-S40 vs. B-40.

This sensor has a parallel-series wiring configuration that cancels the electric field induced signals and makes the sensor's 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-40 Data Sheet. The equation relating to surface current density measurements is:

$$V_o = A_{eq} \mu_0 \frac{dJ_s}{dt} \sin \theta = \text{sensor output (in volts)}$$

where

- A_{eq} = sensor equivalent area (m²)
- μ_0 = 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

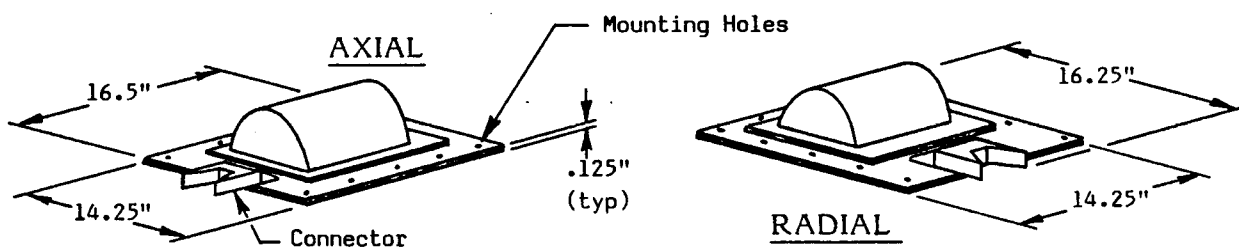
The sensor is a passive device; therefore, an external power source is not required. The sensor is equipped for purging with a gas such as dry air, nitrogen, or SF₆. The sensor is available with an axial output, Model B-S40(A), or a radial output, Model B-S40(R).

ELECTRICAL SPECIFICATIONS

Equivalent Area (A_{eq})	1×10^{-2} m ²
Frequency Response (3dB Point)	>230 MHz
Risetime (t_r 10-90)	<1.5 ns
Maximum Output (peak)	± 5 kV
Output Connector	50 ohm GR-874**

PHYSICAL SPECIFICATIONS

Mass: 4.5 kg (typ)



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.)