Electric field sensors – D-DOT free field, radial output

The AD range of electric field D-DOTs are free-space, high frequency sensors that measure rate of change of electric displacement. Being differential they have two asymptotic sensing elements on opposite sides of a common ground plate and a radial output. The asymptotic design has reduced capacitance and increased upper 3dB point.

AD80

AD100

The sensors are passive devices, therefore, external power is not required. The AD-20R 39.4cm output length can be increased to 100cm maximum with SMA connectors. Models AD-40R and AD-100R are equipped with a 100Ω twinaxial GR connector and gas pressurisation fittings. Length of output, output style and connector type can be modified on request.

SPECIFICATION

	AD-20	AD-40	AD-55	AD-70	AD-80	AD-100
Equivalent Area (Aeq)	1 x $10^{-4}m^2$	1 x $10^{-2}m^2$	3 x $10^{-3}m^2$	1 x $10^{-3}m^2$	3 x $10^{-4}m^2$	1 x $10^{-1}m^2$
Freq. Resp.(3 db pt.)	>10 GHz	>1 GHz	>2 GHz	>3.5 GHz	>5.5 GHz	>350 MHz
Risetime (tr 10-90)	<.029ns	<.29ns	<.17ns	<.11ns	<.064ns	<1.1ns
Capacitance (F)	1.40 x 10^{-13}	2.91 x 10^{-13}	4.49 x 10^{-13}	7.80 x 10^{-13}	1.43 x 10^{-12}	4.58 x 10^{-12}
Maximum output (peak)	+ 150 V	+ 4 kV	+ 1.5 kV	+ 1 kV	+ 1 kV	+ 5 kV
Output connector(s)	SMA(Male)	GR-TCC*	SMA(Male)	SMA(Male)	SMA(Male)	GR-TCC*

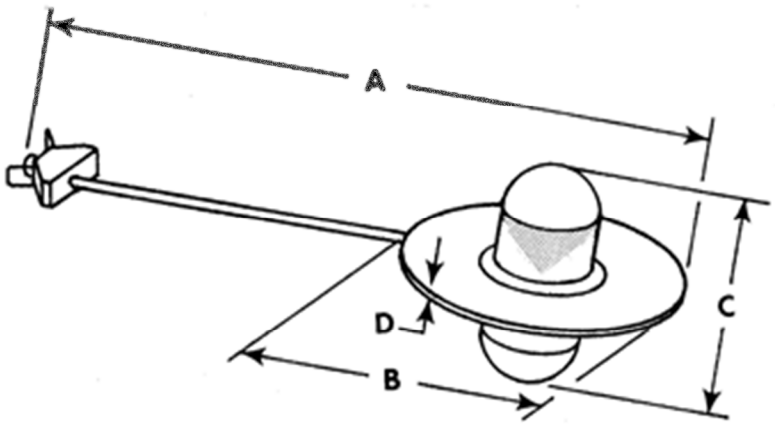
** Sensor connectors (male) are spaced to mate directly with female balun inputs unless specified otherwise*
*** Other connector types are available*

EQUATION

$$V_0 = R\,A_{eq}\,\frac{dD}{dt}$$

Where V_o = sensor output (volts), R = sensor characteristic load impedance (100Ω), A_{eq} = sensor equivalent area (m^2), D = magnitude of electric displacement vector ($\vec{D} = \varepsilon_0 \vec{E}$ in coul/m^2)

DIMENSIONS



	AD_20	AD-40	AD-55	AD-70	AD-80	AD-100
Mass	40g	782g	448g	340g	260g	2.8kg
A (cm) - see outline	39.4	47.5	36.35	38.58	17.78	61.6
B (cm) - see outline	2.54	14	10.16	7.6	5.08	28.26
C (cm) - see outline	1.09	10	5.66	3.31	1.95	31.12
D (cm) - see outline	0.16	0.51	0.48	0.32	0.32	0.64

GAS INSERTION VALVE – AD100 ONLY

The AD-100 has a low-pressure gas valve which allows charging of the cylinder void with a high dialectic gas such as SF6 or Nitrogen. *See separate application note regarding the use of high dielectric gases.*

RECOMMENDED BALUNS

Below is listed a choice of recommended baluns for each D-Dot based on output connector choice. For example, a BIB-170 has an N-type output connector and is suitable for use with an AD-20, AD-55, AD-70 and AD-80.

			Balun Output Connector		
D-Dot	D-Dot Output	Balun Input Connector	SMA (Female)	GR (Locking)	N-Type (Female)
AD-20	SMA (Male)	SMA (Female)	BIB-100		BIB-170
AD-40	GR (Twinax, TCC type)	GR (Twinax, TCC type)	BIB-160	BIB-110 BIB-150	BIB-135
AD-55	SMA (Male)	SMA (Female)	BIB-100		BIB-170
AD-70	SMA (Male)	SMA (Female)	BIB-100		BIB-170
AD-80	SMA (Male)	SMA (Female)	BIB-100		BIB-170
AD-100	GR (Twinax, TCC type)	GR (Twinax, TCC type)	BIB-160	BIB-110 BIB-150	BIB-135

N.B. Baluns are available with different bandwidths. See separate PPM documentation for details.

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