Optical Electric-Field Sensing System

System Description

Photonic Electric Field Sensing System (PEFS) is an instrument that optically measures the electric field. It integrates a fiber optic E-field sensor probe, a laser, photo-receiver, amplifier module, and associated electronics. The probe is made of entirely dielectric materials and connected to the system via fibers. The fiber optic E-field sensor system provides advanced attributes of very fast response, extremely high damage threshold exceeding 5MV/m, high fidelity with little disturbance to the E-field, and remote sensing capability. The sensor system covers a broad frequency range up to 18 GHz. The amplifier gains are adjustable to optimize the sensitivity and the dynamic ranges. The system is designed to connect to a spectrum analyzer to characterize the RF signal outputs.

Features

- No metal parts in probe
- Passive probe
- Miniature probe
- Optic fiber link
- High sensitivity
- Wide bandwidth
- High damage threshold

Applications

- Pulse E-field measurement
- CW RF field measurement and characterization

Performance Specifications

PEFS Model	Min	Typical	Max	Unit
Sensor orientation		Parallel to E-field		
Frequency Bandwidth [1][2] (HF version)		18		GHz
(MF version)		7		GHz
(LF version)		200		MHz
Sensitivity (HF version)		80		mV/m-Hz$^{1/2}$
(MF and LF version)		40		mV/m-Hz$^{1/2}$
Maximum detectable E-field [3]		200		kV/m
Damage E-field			5	MV/m
Fiber		PMF/SMF		
Fiber Connector		FC/APC		
Laser wavelength		1550		nm
Laser power [4]		10		mW
RF output impedance		50		Ω
RF connector		SMA		
Power supplier		100~240		VAC

[1]. Should be matched with the proper EOFS.
[2]. There is the frequency cut-off at low frequency, such as 10MHz for HF version, 5MHz for MF version.
[3]. Possible to be increased to 500kV/m, please contact us
[4]. TBD per the frequency and sensitivity

15 Presidential Way, Woburn, MA 01801 Tel:(781)935-1200 Fax:(781)935-2040

www.agiltron.com

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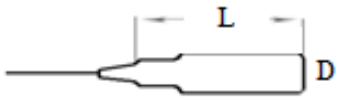
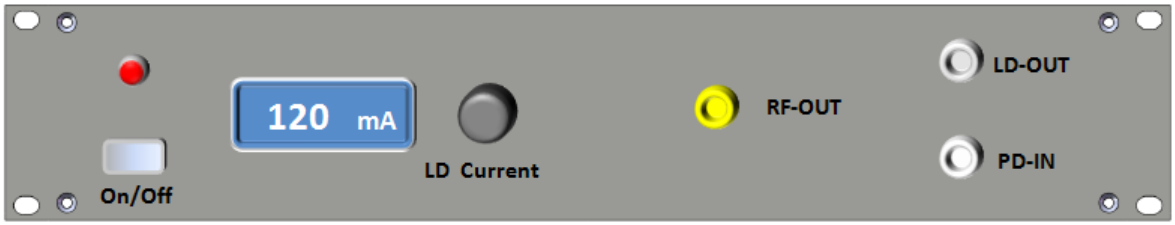
Typical System & Probe Dimensions (Single channel)



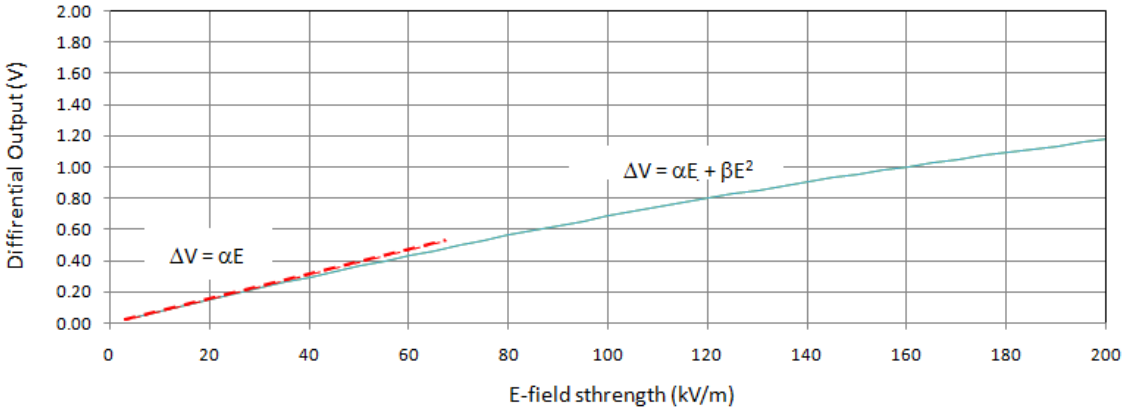
Reflective Sensor probe

L = 50 ~ 60mm
D = 8mm in diameter



Schematic diagram of front panel in 2RU 19" rack

Typical RF output (V) vs. E-filed strength



1) The linear approximation can be used for weak E-field measurement (ex. E < 20kV/m).
2) α and β coefficients needs to be calibrated.

Ordering Information

PEFS -	☐ ☐	2	1	☐	1	1	3	3
	System Type	Sensor Type	Package	Fiber Type	Channel Configuration [1]		Fiber Length	Connector
	S8= 18GHz S7 = 7GHz P3 = 300MHz 00 = Special	Reflective=2	1 = 1RU 19" rack 2 = 2RU 19" rack 0=Special	Bare Fiber =1 900 μm Tube =3 Armored cable=4 Special=0	1 Channel = 1 2 Channels = 2 3 Channels = 3 Special =0	Standard =1 Switchable = 3 Special =0	1m =3 Special=0	FC/APC=3 Special =0

[1] Standard means the independence between channels for multiple channels.

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