PL7004
Electric Field Probe for Pulsed Fields

- 800MHz–3.6GHz
- 80–800 V/m
- User–selectable X, Y, Z Axes

Features

The PL7004 is designed specifically for use in measuring pulsed electric fields found in radiated immunity testing (for example, automotive radar pulse tests General Motors GMW3097 and Ford ES-XW7T-1A278-AC). The probe is calibrated to measure the RMS level during the ON time of a pulsed electric field.

Correction factors are provided with the probe. These factors can be loaded into the Model FM7004A Field Monitor (sold separately) to automatically correct the probe readings at user-specified frequencies. When correction factors are applied, the true accuracy of the probe can be realized.

This probe is NOT designed to respond to CW fields. AR offers an extensive line of field probes for CW measurement.

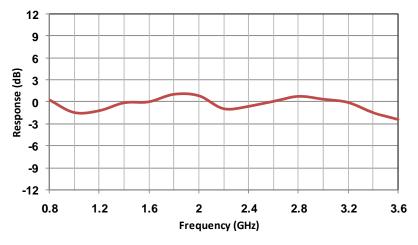This is a smart, fast, extremely accurate pulsed electric field probe that contains an internal microprocessor to provide linearization, temperature compensation, control, and communication functions. Noise reduction and temperature compensation allow accurate measurements without zero adjustment.

The probe is laser powered to allow for continuous operation without battery recharging or replacement. It communicates and is powered through glass fiber optic cables, up to 100 meters long, connecting to the FI7000 interface. X, Y, Z, and isotropic readings can be returned through an FI7000 in 20 msec.

The PL7004 extends the range of AR laser powered E–field probes to use in measuring peak pulsed electric fields. Response-smoothing time constants provide consistent readings for pulse rates as low as 200Hz, approximately 1 second after an input change.

This probe requires an FI7000 for power and communication. FM7004A is recommended for local monitoring and control.

PL7004 Typical Frequency Response (1kHz pulse rate, 1% duty)

AR RF/Microwave Instrumentation
160 School House Rd
Souderton, PA 18964
215-723-8181

For an applications engineer call:800.933.8181

www.arworld.us

rf/microwave instrumentation

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Specifications

Relative Flatness (field aligned with sensor axes): ±2.5 dB, 800 MHz-3 GHz; ±3.0 dB, 3.0 GHz-3.6 GHz

Amplitude Accuracy (field aligned with sensor axes):
Without correction factors applied: ±1.5 dB @ 1 GHz;
With correction factors applied: Typical expanded measurement uncertainty (95% confidence interval), 0.8 dB, 800 MHz–1 GHz; 1.4 dB, 1GHz–3.6 GHz

Response Time/Sampling Rate (through FI7000): 20 msec/up to 50 samples per second at FI7000, USB and GPIB only

Isotropic Deviation (measured at the ortho angle): ±1.0 dB @ 1 GHz. *For improved accuracy, this probe should be used with a single axis aligned with the E-field being measured.*

Operating Range: 80–800 V/m

Linearity, 80 to 800 V/m: ±0.5 dB

Pulse width: 1 to 100 microseconds

Pulse Period: Up to 5 milliseconds between pulses (greater than 200 Hz pulse rate)

Pulse Duty: 0.02% to 2%

Pulse Measurement Variation: Over Range of Pulse Width, Period, and Duty relative to a 10 microsecond pulse width and 1 millisecond pulse period (1kHz pulse rate, 1% duty): ±0.5 dB/–1.0 dB typical

Damage Level: 1000 V/m, continuous field or pulsed field

Ranges: Single range

Data returned from probe: X, Y, Z axes, and composite

Power Requirements: Laser powered from FI7000 interface

Dimensions: Approx. 5.7 x 5.7 x 5.7 cm (2.25 x 2.25 x 2.25 in); 2.92 cm (1.15 in) in DIA spherical housing; 3.18 cm (1.25 in) sensor radome per axes

Weight: Approx. 62.5 g (2.2 oz)

Operating Temperature Range: 10°C to 40°C (50°F to 104°F) @ 5% to 95% RH non-condensing

Temperature Stability: ±0.5 dB over operating temperature range

Fiber Optic Connectors: Two E2000 compact duplex connectors at 1 meter, includes fiber optic verification loop.

Calibration Data: Accredited Calibration Report supplied with probe

Measurement Data Processing: The pulse amplitude measurement is smoothed before being sampled and digitized. The smoothing process has a time constant of 300 msec.